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TECHNICAL SAFETY APPRAISAL REFERENCE MANUAL

VOLUME 1

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Approved:

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PREFACE

The responsibility for safety at DOE facilities inherently rests with the operators of the facility. DOE program offices and field offices are obliged to ensure that facilities within the scope of their managerial or contractual control are operated in a manner that is consistent with DOE policies and Orders, including those that govern safety. The DOE Technical Safety Appraisal (TSA) program is conducted to provide DOE with information concerning the implementation of safety programs at DOE facilities that can be used by all parties to effect improvements and achieve excellence in performance.

If the DOE program and field offices, contractors, and Office of Safety Appraisals are to act together to achieve the desired excellence of safety performance, they must have a common understanding of the goals and criteria to be applied in establishing and evaluating facility safety programs.

This manual expresses the Performance Objectives and Criteria that form the basis of the DOE TSA program, as well as the procedures that will guide the conduct of the appraisals. The Performance Objectives and Criteria for TSAs (Appendix A) are modeled on the "deviations from excellence" approach used by Institute for Nuclear Power Operations (INPO) in its plant evaluations. It can, therefore, serve as a focus for dialogue within DOE on how best to achieve continual improvement of safety at DOE facilities in a manner that is consistent with DOE's energy and national security mission.

The readers and users of the manual, particularly the TSA Team Leaders and team members, are invited to provide written comments and recommendations for improvement of the manual to the Director, Safety Inspections Division. The manual will be updated periodically, at quarterly intervals in the beginning, to reflect the suggested improvements and evolution of the appraisal program.

TECHNICAL SAFETY APPRAISAL REFERENCE MANUAL

1.0 INTRODUCTION

1.1 The TSA Program

In accordance with the safety and health initiatives announced by the Secretary on September 18, 1985, EH conducts Technical Safety Appraisals (TSAs) of DOE Category A reactors, high hazard nuclear facilities, and selected moderate hazard facilities. A TSA is a documented multi-disciplinary facility appraisal conducted by a team of specialists selected and led by EH management. The appraisals are conducted using a "hands-on" approach by observing both the facility configuration and the performance of routine operations. DOE 5482.1A requires that written guidance and criteria be employed to assure relevance, depth, and consistency among the TSAs. The procedures in Section 3.0 of this manual provide a portion of that guidance.

The criteria against which each facility is reviewed (the remaining portion of the written "guidance and criteria" required by DOE 5482.1B) are called Performance Objectives and Criteria and are contained in Appendix A to this manual. They include criteria representing minimum requirements to satisfy DOE policies and contractual requirements, and additional criteria that provide a framework for achieving excellence in the development and implementation of safety programs at DOE facilities.

The manual is organized to describe first the administrative and managerial framework within which the appraisal activities are carried out. This is followed by a description of the preparation for the appraisal, the conduct of the appraisal and the followup activities. Finally, the functional areas examined during technical safety appraisals, and the associated performance objectives and criteria, are described.

1.2 The Appraisal Objective

The objective of the technical safety appraisal program is to provide DOE with an independent overall evaluation of the performance of the safety programs at DOE

2.0 RESOURCES AND ADMINISTRATION

2.1 EH Managers

A. The Team Leader is a senior technical member of the EH Office of Safety Appraisals, Safety Inspections Division, designated by the Director, Safety Inspections Division to have the key functional responsibility for the conduct of an appraisal. The Team Leader:

1. plans the appraisals for which he/she has been designated and coordinates the design of the specific TSA with the designated EH Senior Manager;

2. coordinates with EH Office Directors and Division Directors in the selection of team members for the TSA and assures that potential conflicts of interest between team members and the appraised facility are avoided;

3. arranges the daily schedule for the TSA, including team briefings by contractor personnel;

4. coordinates the TSA effort with the DOE resident engineer to ensure that his/her input supplements the team's activities;

5. initiates efforts to obtain team members from field offices other than the one having contractual responsibility for the facility to be appraised;

6. negotiates with the contracting field office, cognizant operations office, and program office to designate representatives for liaison with the team;

7. manages the efforts of the team at the facility to ensure that the appraisal is carried out in a thorough and responsible manner;

8. acts as the focal point for the conduct of the TSA and serves as the EH point of contact with HQ, field office, and contractor personnel. The Team Leader will seek to reinforce a cooperative spirit among the contractor, operations office,

Headquarters program office, the resident engineer, and the team to assure that each supports the other in pursuing the common goal of improved safety;

9. manages the preparation and quality review of a written report documenting the team's findings and concerns;

10. prepares a draft TSA Report, based upon the team's findings and concerns;

11. prepares and signs the final TSA Report;

12. leads any post-appraisal follow-up at the facility; and

13. is supported by an Assistant Team Leader and an Appraisal Coordinator.

    a. The Assistant Team Leader provides assistance to the Team Leader as directed, including standing in for the Team Leader when necessary.

    b. The Appraisal Coordinator works closely with the Team Leader and Assistant Team Leader, directing the word processing/printing aspects of the TSA report, arranging logistics for conducting the TSA, and providing other administrative support, as necessary.

B. An EH Senior Manager is assigned to represent EH management and provide guidance to the TSA team as required. The EH Senior Manager:

1. participates with the Team Leader in the design of the TSA;

2. represents EH management in the TSA team entry and exit meetings with the operating contractor at the site;

3. serves as spokesperson in TSA briefings presented to DOE-HQ line management;

4. prepares a draft Performance Evaluation based upon the team's findings and concerns and personal observations and interfaces with EH Office Directors in developing the performance evaluation for the TSA; (The draft performance

evaluation should be completed within 5 working days of the close-out meeting.)

5. reviews, concurs in, and signs the TSA Report.

C. The Deputy Assistant Secretary for Safety, Health, and Quality Assurance:

1. approves the final roster of team members, team leader, and EH Senior Manager;

2. approves the long-term TSA schedule;

3. approves and signs each final TSA Report; and

4. transmits the TSA Report to the contracting Operations Office Manager with a copy to the cognizant Program Secretarial Officer.

D. The Director, Office of Safety Appraisals:

1. concurs in the recommendations of the Director, Safety Inspections Division, regarding designation of EH managers to serve as EH Senior Manager on TSAs;

2. concurs in the selection of team members recommended by Director, Safety Inspections Division, and the Team Leader;

3. concurs in the long-term TSA schedule;

4. concurs in the TSA transmittal correspondence;

5. concurs in each TSA and related correspondence as meeting Office of Safety Appraisals requirements on transmittal to Deputy Assistant Secretary for final approval; and

6. serves from time to time as the EH Senior Manager on TSAs.

E. The Director, Safety Inspections Division, has primary management responsibility for the TSA program. With regard to the performance of an individual appraisal, the Director:

1. serves from time to time as the EH Senior Manager and develops the list of Senior Manager assignments after negotiation with the individual managers;

2. appoints the Team Leader for each TSA;

3. encourages cognizant Headquarters program offices, operations offices, and field offices, when invited to participate in a TSA, to designate observers;

4. concurs in the selection of team members based upon recommendations from the Team Leader;

5. assigns an Appraisal Coordinator to work with the Team Leader;

6. establishes and maintains on a quarterly basis the annual schedule for TSAs showing, for each appraisal, the facility, dates, and team members;

7. assures that adequate resources are available for conducting the TSA; and

8. concurs in the TSA transmittal correspondence.

F. The EH Office and Division Directors:

1. review the findings and concerns in the team report and provide input into the performance evaluation to be included in the TSA Report;

2. participate in the active follow-up on the TSA concerns (The Office of Safety Compliance Staff is responsible for day-to-day follow-up on corrective actions identified as a result of the TSA.);

3. assist the Team Leader in identifying highly qualified team members for conducting the TSAs; and

4. provide general guidance in their technical area of responsibility to the TSA team specialists.

5. The Associate Deputy Assistant Secretary, Director of the Office of Safety Appraisals, EH Senior Manager and the Director, Safety Inspections Division, are on concurrence for memoranda transmitting TSAs to the Deputy Assistant Secretary and other related transmittal correspondence.

2.2 The Appraisal Team

A. TSAs are conducted by a team of experienced individuals representing expertise in the areas of facility management, operations, safety technology, and quality assurance. Some of the specialized areas represented are:

1. reactor physics, chemical processes, and/or nuclear materials fabrication
2. criticality safety
3. instrumentation and controls
4. mechanical/electrical/fluid systems
5. radiological protection
6. emergency preparedness
7. auxiliary systems (effluent control, chemistry control, waste handling, etc.)
8. training
9. fire protection
10. occupational safety
11. industrial hygiene
12. packaging and transportation of hazardous materials
13. safety review processes
14. organization and administration
15. quality assurance

B. Team members are selected from a roster which provides for the individuals listed, their name, address, expertise, security clearance status, professional background, present and past professional affiliations, and areas of potential conflict of interest relative to the performance of TSAs at DOE facilities. The Team Leader reviews this information to identify needed expertise and any potential basis for excluding or restricting the use of an individual on a particular TSA (because of conflict of

interest considerations). The team contains as many technical specialists as the Team Leader deems necessary to accomplish a high quality appraisal. Team members may be selected from a field office other than the one with contractual responsibility.

C. The Headquarters program office and the contracting field office are invited to designate representatives for liaison with the team.

D. The resident engineer is not a member of the TSA team. He/she is a source of information for the TSA Team Leader and the EH Senior Manager. The Team Leader consults with the resident engineer, in particular during the preparation phase, to gather information on the facility concerning the strengths and weaknesses and other aspects of the facility's operational safety program, and invites the resident engineer to attend meetings with the facility management.

E. Team members are expected to work cooperatively to provide a quality appraisal of the facility operation as well as provide quality documentation of the results of that appraisal.

F. The objective of each team member is to gain a thorough understanding of the extent to which the current operation of the facility:

1. conforms to the requirements and procedures established by the contractor;

2. meets applicable DOE orders, other requirements, and good operating practices -- Appendix A lists the DOE orders applicable to operational safety TSAs;

3. has utilized lessons learned in DOE and the nuclear industry; and

4. compares to good operating practices and applicable NRC-licensed facility requirements.

G. Each team member will use the Performance Objectives and Criteria as the basis for planning his/her efforts. The Performance Objectives and Criteria are arranged

to allow assignments to team members in specific subject areas. They are intended to promote conformity of content from one appraisal to the next.

H. Team members will receive direction from the Team Leader. Each team member will be responsible for discussing all findings and concerns proposed for inclusion in the appraisal report with a designated EH technical line manager or engineering counterpart. The purpose of these discussions is to ensure consistency of the findings and concerns with DOE safety policies and to provide the EH line managers with the understanding necessary to develop effective recommendations to the team.

I. The Team Leader is responsible to the Director, Safety Inspections Division, for the performance of the appraisal in accordance with the procedures in Section 3.0, and for the quality of the team report.

J. The appraisal team for a specific facility will be deactivated after it has considered and resolved, as appropriate, any comments made by the field office and contractor on factual matters in its report. Team members will be formally notified of the team's deactivation by letter from the Director, Safety Inspections Division.

K. Approximately three to four weeks after the TSA closeout meeting with the facility's management, representatives of the Office of Safety Compliance will visit the facility to ascertain progress on any critical safety concerns (Category 1 and 2 concerns) and to arrange for day-to-day tracking and follow-up of other (Category 3) concerns identified in the draft TSA report provided to the facility's management and discussed at the closeout meeting.

3.0 APPRAISAL ACTIVITIES

An annual schedule for conducting TSAs, which identifies the facilities to be appraised, the dates of the appraisal, and the EH Team Leader for each appraisal, will be established and maintained on a quarterly basis by the Director, Safety Inspections Division. The Team Leader will use this schedule as a basis for initiating the planning and coordination activities for the TSAs during the coming year.

TSAs are usually conducted over a period of several weeks. Initially, a two-to-three day, pre-appraisal planning visit is made by the Team Leader and Appraisal Coordinator. Subsequently, an orientation visit, usually lasting about one week, is made by the entire appraisal team, to obtain any required training and copies of documents for study. An "Opening Meeting" is held with the TSA team, the EH Senior Manager, and the facility management, to allow for familiarization briefings on the facility organization, layout and operation. The actual appraisal visit occurs about a week later, after the team has reviewed material gathered on the orientation visit, and lasts for approximately two weeks. A "Close-out" meeting is held with the TSA team, the EH Senior Manager, and the facility management on the last day of the appraisal visit. A copy of the draft TSA report is provided to the facility management, and the findings and concerns resulting from the TSA are discussed at that time. This TSA "standard schedule' may be reduced or extended as required by the nature of the TSA.

3.1 Planning and Selection of Team Members

A. The Team Leader, in planning the TSA, makes a pre-appraisal planning visit to the facility. The purpose of this visit is to obtain the information the Team Leader needs to develop an appraisal plan and to structure the team composition. During the visit, the Team Leader tours the facility, meets with the field/area office liaison representative, the resident engineer, and the facility contractor management in order to obtain first-hand information concerning the facility's operational safety program, thereby providing the basis for the appraisal plan. It is advantageous for the EH Senior Manager also to visit the facility and to develop a preliminary

assessment of the safety culture and attitudes that exist at the facility, in order to more effectively participate in the TSA planning.

B. Based in part upon this visit to the facility, the Team Leader develops the appraisal plan. Other factors which the Team Leader considers in developing the appraisal plan include performance indicators, reports of the Systematic Assessment of Facility Performance, resident engineer and field office appraisals, previous appraisals done under the TSA Program, and generic issues from other TSAs. The elements of the plan include:

1. The functional areas to be appraised. Any deviation from the standard list of functional areas specified in this manual (2.2A) shall be explained in the plan. Such factors as the results and frequency of past appraisals may be considered in deciding on a deviation.

2. The number of team members needed to support the appraisal in each functional area. Combining functional areas may be considered where a specific basis exists and is approved.

3. The lengths of the orientation visit and the appraisal visit. These time periods may vary depending on the complexity of the facility and the perceived nature of the problems.

The Team Leader records the plan on a standard TSA Plan form (Figure 1) for review and approval by the Director, Safety Inspections Division. As team members are selected and approved, their names, affiliations, specialties, and assignments are listed in the TSA Plan.

C. The team composition is developed in consultation with appropriate organizational elements of EH. The team members proposed by the Team Leader may be from within the EH organization field offices, or from the roster of potential team members described above. During the team selection process, the Team Leader contacts prospective team members regarding their availability for the TSA assignment. When the team membership is firm, the facility management is informed of the team members and their qualifications (usually in the form of one-page resumes). The facility, in turn, sends each team member a package which

contains general information about the facility (a description of the facility, its organization, and its major programs. At this point, the team is ready to participate in the next phase of the TSA, the team orientation.

3.2 Preparation for the Team Orientation Visit

A. The exact dates of the team visits will be confirmed by the Team Leader at least two months in advance to announce and allow planning the appraisal on the operation of the facility while assuring that the team will be at the facility during operation or other representative status. Any specific area of interest to be emphasized in the appraisal will be identified for the field office and the contractor at that time.

B. The Team Leader will request the contractor to identify a counterpart for each team member to utilize as a resource during planning, appraisal performance, and verification of facts.

C. The Team Leader will arrange with the management of the facility being appraised for a first-hand orientation on the facility and its safety operations during the initial team visit. This orientation visit will also permit team members to develop working interfaces with each other and with their contractor counterparts, and to review materials that are impractical to distribute such as classified material or bulky, extensive documents.

D. The Team Leader should, at the time of announcing the appraisal visits and confirming dates, request from the contractor, through the cognizant field office, those documents needed for the team to prepare for the appraisal. Among the information which should be considered for inclusion in this request are:

- Contractor organizational charts;
- Facility organization chart and listing of key personnel with job assignments, including identification of technical support, QA, health physics, and other personnel supporting the facility's operation but not reporting to the facility manager;
- General facility layout drawings;

- Award fee decisions for the last eight fiscal quarters;
- Charters for safety committees (DOE and contractor) reviewing facility activities;
- A description of facility operations, tests, maintenance and other work expected to be in progress during the team visit (i.e., calibration of effluent monitoring equipment, containment leak rate test, preventive maintenance, emergency drills, etc.);
- Field office appraisal reports covering the facility for the past two years (only those not already available in the Office of Safety Appraisals);
- Contractor ES&H audit reports involving the facility for the past two years, including training program evaluations;
- An index of policy statements and procedures for facility operations, contractor radiation protection, criticality safety, and quality assurance manuals, and other ES&H activities;
- Contractor and facility emergency plans and facility emergency procedures;
- Accident and incident reports for the past five years;
- Unusual Occurrence Reports (UOR) for the past three years;
- Training plans and manuals for facility and support personnel;
- Statistics on training and certification activities for the past two years (facility and support personnel);
- Safety Analysis Report (SAR) with applicable addenda;
- Summary description of facility;

- Selected System Design Descriptions;
- Technical Specifications and Operational Safety Requirements;
- Operating history for the facility for the past two years, with an explanation of downtimes (scheduled or unscheduled); and
- Rates of turnover of operating and supporting personnel, with an interpretation of the rates.

For items of general interest (i.e., Summary Facility Description), several copies should be obtained if readily available, even if on a loan basis.

E. The Team Leader should identify where and when the requested documents should be made available. Some documents may be required to be distributed to the team members prior to their orientation visit to the facility. Other documents might only be required at the time of the orientation visit. This latter category could include:

- Operating and maintenance procedures (facility procedures, standing orders, etc.).
- Work control and test procedures.
- Radiation exposure records.
- The latest test results (including performance, failures, etc.)for specific safety equipment.
- Results of latest emergency drills, including critiques.
- Training materials utilized in qualifying facility and support personnel, including an overview of the components of each training program and their goals and objectives, copies of recent written exams in each program.

F. The Team Leader will provide to each team member written appraisal criteria (TSA Performance Objectives and Criteria) applicable to his/her assigned area for use in formulating the details of the work effort. In addition, DOE Orders applicable to a particular functional area will be made available at the facility for use by team members to verify compliance with DOE requirements.

G. Prior to the orientation visit, team members will familiarize themselves with the content of the materials provided to them as it pertains to their assigned appraisal areas. Team members may consult with their contractor counterparts during this review.

H. After reviewing the material provided to aid in preparing for the on-site visit, team members should identify to the Team Leader additional items that they need to review at the site. This request will be approved and transmitted by the Team Leader to the facility management.

3.3 The Team Orientation Visit

A. The team visits the facility for an initial one-week period, for team orientation, information gathering and collection of documents to be reviewed in preparation for the appraisal. Initially the Team Leader informs the team of the general schedule to be followed, and the ground rules under which the team will work. Such topics as the frequency of team meetings, the source of available information, and the schedule for the week are covered. Pertinent DOE orders and other guidance are provided to the team members.

B. A formal entry briefing will be held with representatives of the cognizant operations office and contractor as soon as practicable upon the team's arrival at the facility for orientation. The EH Senior Manager and Team Leader, the contractor, and, if it wishes, the operations office, will each present general information pertinent to the appraisal. The contractor presentation should be limited to topics relating to the facility to be appraised. General programs relating to other facilities should not be discussed. The EH presentation will introduce the appraisal team, address the purpose and scope of the appraisal, establish desired protocol, and generally set the tone of the appraisal as a constructive effort to help assure continued improvement in the safety of the facility being appraised.

C. Each team member will tour the facility with a contractor counterpart for orientation and familiarization.

D. The orientation activities involve the collection of additional information and documents needed to prepare for the appraisal. Individual team members may also use available time to initiate their appraisal. Team members should develop a list of the information needed to prepare for the appraisal visit and provide it to the Team Leader.This information will be made available to each team member prior to departure from the facility.

E. During the interval between the orientation and the appraisal visits, each team member conducts a review of the information made available by the facility. This work is done elsewhere. Based on this review, the team member develops an appraisal plan, which is to be approved by the Team Leader and provided to the facility counterpart for use in supporting the appraisal. This plan should outline a daily appraisal schedule covering those days in which the team member will require facility support in the form of records availability and personnel interviews.

3.4 The Appraisal

A. During the appraisal visit, team members will spend the majority of their time at the facility observing operational activities, observing the condition of hardware and instruments, and reviewing relevant documentation such as procedures, log books, test records, and monitoring reports. Where possible, this should include observations of back and swing shift work, maintenance tasks as they are actually performed, and facility evolutions.

B. Because operations are to be disrupted as little as possible, team members will work closely with their contractor counterparts to arrange for observations, tours, interviews, etc. Discussions with facility personnel are recognized as essential to an accurate understanding, but formal interviews will be held to a minimum. Requests for drills are discouraged; they will be requested of the contractor only by the Team Leader, through the field office, with as much advance notice as possible.

C. "Walk-throughs" of phases of the operation of interest to the appraisers that are not possible to observe during the time the appraisal team is in the field (i.e., reactor refueling, manipulation of material in a glove box, filter change-out, etc.) are strongly encouraged.

D. During this information collection activity, team members will likely obtain information or observe items of apparent concern that are within another team member's area of responsibility. To pass this item on to the appropriate team member, Observation Cards, (see Figure 2) which have previously been provided to the team members by the Team Leader, should be completed as soon as possible, and preferably at the time the observation is made and discussed at team meetings or with the team member concerned.

E. There will be team meetings daily, or as required by the Team Leader, to review findings and to share the more important observations and concerns. To facilitate the efficient transfer of information, each team member should be prepared to discuss these at the team meeting.

F. The Team Leader will encourage team members to record each of the substantial information items they collected on a compilation worksheet each evening. This mechanism has been found to be useful to organize information collected, formulate tentative concerns, and reveal the nature of missing information needed to further develop findings and concerns.

G. Each team member will write a concise statement of his findings and concerns for inclusion in the team report.

H. Each team member will investigate the root causes of each concern and report the results in writing to the Team Leader when finished. When the investigation indicates that the root cause falls outside, or is broader than, the team member's area of responsibility, this is to be communicated to the Team Leader, who will assume responsibility for determining whether and how further investigation will be pursued.

I. Each team member will participate in a quality review group established by the Team Leader and comprised of two to four team members. The group will critically

review its members' draft concerns and noteworthy practices for clarity of intent, significance, and adequacy of the written justification.

J. Each team member will discuss the proposed findings with the contractor counterpart to verify the accuracy and completeness of the factual information accumulated.

K. The team members will discuss their findings and concerns with the designated EH line manager to affirm consistency with DOE policy.

L. The Team Leader will hold individual meetings with each team member as necessary to ensure a clear mutual understanding of each finding and concern, and that all concerns are clearly stated, consistent, and well supported. The Team Leader will integrate duplicative or overlapping findings and concerns.

M. The draft report will be written, typed, and edited in the field. Team members who have completed their portions of the report will assist the Team Leader in a critical review of the draft report for clarity, consistency, and grammatical correctness. The cover and each page of this report will be conspicuously marked "DRAFT."

N. Some team members with highly specialized assignments (e.g., fire protection, industrial hygiene) may not be required to be present during the entire appraisal period. The time and duration of their presence will be as agreed with the Team Leader. They should be available during the close-out meeting with facility management.

3.5 Report Content and Format

The TSA report will be structured as follows:

Cover Page - For draft reports, a white cover page with black print will be used (see Figure 3). For final reports, a light blue cover page with black print will be used (see Figure 4). A signature page will be included in the final report directly behind the cover page (see Figure 5).

I. INTRODUCTION

Names the facility appraised, identifies the operating contractor and the responsible field office and HQ program organizations. States the purpose of the appraisal and its content, and an overview of how it was conducted. Provides information on exit meetings held. By reference to appropriate appendices, identifies pertinent information.

II. PERFORMANCE EVALUATION

This section consists of a succinct description, prepared by EH management, of the facility's performance in the safety program based upon the findings and concerns of the appraisal team. It is important that this section emphasize the performance of the facility rather than statistics and/or revisitation of the findings and concerns articulated in the "III. Review Findings" section.

The performance evaluation is used by EH to synthesize the appraisal team's observations and insights into a facility's performance and to identify common themes or symptoms. As such, EH needs to recognize and understand the reasons for a contractor's strengths as well as weaknesses. The performance evaluation is a means of expressing EH senior management's observations and judgments on contractor performance. It should not be limited to focusing on weaknesses, and it is not intended to identify proposed resolutions or solutions of problems. The contractor's management (as well as the cognizant DOE management: program office, operations office, site/field office) is responsible for ensuring facility safety and establishing effective means to measure, monitor, and evaluate the quality of all aspects of facility design, hardware, and operation. The performance evaluation is intended to be a statement of: (1) how the contractor's management guides, directs, evaluates, and provides resources for safe facility operations, and (2) how these resources are applied and used. As a result, emphasis is placed on understanding the reasons for a contractor's performance in identified functional areas and on sharing this understanding with the contractor and the public. The performance evaluation is intended to be sufficiently diagnostic to provide a rationale for allocating DOE resources and to provide meaningful feedback to a contractor's management and their cognizant DOE managers.

Facilities will be evaluated in the functional areas reviewed during the TSA (see 2.2A). The evaluation criteria for each functional area have been consolidated into three criteria:

a. Management Authority and Responsibility
b. Safety Criteria, and
c. Safety Assessment

Attributes will be addressed for each of these criteria. The attributes for each of these criteria are discussed below:

a. Management Authority and Responsibility

Prior planning and assignment of activitities

Statement and definition of procedures for control of activities

Level of decisionmaking to assure management review

Effective involvement of senior management in site activities

Timely resolution of issues

Timeliness, effectiveness, and consistency of implementation of DOE initiatives and policies

Timeliness and completeness of reporting events and other reportable information

Identification of key positions, definition of responsibilities, timely and appropriate filling of vacancies

Experience and training levels of personnel

Timeliness of management verification that procedures are followed and deviations are corrected

b. Safety Criteria

Consistency and technical adequacy of engineering evaluations

Completeness, maintenance and availability of facility records and performance data

Statement, dissemination, understandability and implementation of policies in procedures

Demonstration of clarity of understanding of safety issues

Exhibition of conservatism when potential for safety significance exists

Technical soundness and thoroughness of approaches

Proper identification and analysis of events

Frequency of significant events attributed to causes under the contractor's control occurring that are relevant to the specific functional area

c. Safety Assessment

Quality and use of operating experience feedback from safety review groups and quality assurance/quality control activities to improve work activities

Effectiveness of root cause analysis and corrective actions as reflected in frequency of repetition of events

Anticipatory quality of safety review activities and success of identification of problems prior to occurrence

Quality of documentation and demonstration of technical rationale in reviews to justify deviation from requirements or to justify continuation of operations

Availability of resources to maintain technological vigilence to provide continued safety of operations

The performance evaluation assesses the quality of contractor safety activities and the degree to which a contractor demonstrates superior performance. The evaluation should be firmly based upon the findings and concerns articulated by the team's appraisal, with concise examples of performance where necessary. However, it should not be a reiteration of the concerns and findings, nor should it provide statistics or other attempts at providing a numerical summary of conditions. It is essential that this section capture and articulate the safety performance of the facility.

III. FINDINGS

This section addresses the findings and any concerns relating to the facility safety program. Each functional area is covered by a summary of the results of the appraisal in that area, followed by the specific findings and concerns related to each performance objective. Each performance objective must be addressed by one or more findings.

A finding is a factual statement about the safety program of the facility that is directly related to the TSA performance objectives and criteria or commonly accepted standards of good practice. Sufficient information should be provided to convey the basis for the finding.

A concern is an explanation of a team member's opinion that a finding represents a weakness in the facility safety program that should be addressed or further evaluated. The explanation should be as objective as possible, with reference to the weakness and its possible consequences; it should not address the possible corrective measures, nor should it include opinions or judgments regarding the performance of the facility or its staff.

Findings directly related to an expressed concern are identified by an asterisk.

Each concern contained in the report is categorized for SERIOUSNESS using the following criteria:

CATEGORY I: Addresses a situation for which a "clear and present" danger exists to workers or members or the public. A concern in this category is to be immediately conveyed to the managers of the facility for action. If a clear and present danger exists, the Assistant Secretary for Environment, Safety, and Health (EH-1), or his designee, is informed immediately, so that consideration may be given to exercising the Secretary's facility shutdown authority or direction of other immediate mitigation.

CATEGORY II: Addresses a significant risk or substantial noncompliance with DOE Orders (but does not involve a situation for which a clear and present danger exists to workers or members of the public). A concern in this category is to be conveyed to the manager of the facility no later than the appraisal close-out meeting for immediate attention. Category II concerns have a significance and urgency such that the necessary field response should not be delayed until the preparation of a final report and the routine development of an action plan.

Any issues surrounding the concern should be addressed during the appraisal or immediately thereafter. Again, consideration should be given to whether compensatory measures, mitigation or facility shutdown are warranted under the circumstances.

CATEGORY III: Addresses significant noncompliance with DOE Orders, or significant need for improvement in the margin of safety, but is not of sufficient urgency to require immediate attention.

Each concern in the report is also categorized by its POTENTIAL HAZARD CONSIDERATIONS using the following criteria:

Level 1. Has the potential for causing a severe injury or fatality, a fatal occupational illness, or loss of the facility.

Level 2. Has the potential for causing minor injury, minor occupational illness, major property damage, or has the potential for resulting in, or contributing to, unnecessary exposure to radiation or toxic substance.

Level 3. Has little potential for threatening safety, health, or property.

Each concern in the report is categorized for its COMPLIANCE CONSIDERATIONS using the following criteria:

Level 1. Does not comply with mandatory DOE requirements (DOE Orders), prescribed policies or standards, or documented accepted practice (the latter is a professional judgment based on the acceptance and applicability of national consensus standards not prescribed by DOE requirements).

Level 2. Does not comply with DOE reference standards, guidance, or with good practice (as derived from industry experience, but not based on national consensus standards).

Level 3. Has little or no compliance considerations; these concerns are based on professional judgment in pursuit of excellence in design or practice (i.e., these are improvements for their own sake--not deficiency-driven).

IV. NOTEWORTHY PRACTICE

A noteworthy practice is an exceptionally good method used by the facility to accomplish some aspect of a performance objective, which the team members feel would contribute to excellence in operation if adopted at other facilities.

APPENDIX A: System for Categorizing Concerns

APPENDIX B: Categorization and Tabulation of Concerns

APPENDIX C: Status of Recommendations

APPENDIX D: Team Composition

APPENDIX E: Biographical Sketches of Team Members

3.6 Close-out Meetings

A. The Team Leader summarizes the appraisal results in one or more close-out meetings held with the facility manager and high level contractor and DOE field office managers. As a courtesy, consideration should be given to meeting with the operations office management separately and prior to the contractor meeting. Attendance at the close-out meeting with facility management will be determined by the Team Leader, EH Senior Manager, and the facility manager. This meeting will not be open to the public as classified material may be discussed.

B. The EH Senior Manager will participate in the close-out meeting(s) with the contractor and field office management. Upon his/her arrival at the site, the Team Leader informs him/her of all team findings and concerns. The EH Senior Manager will begin to develop the performance evaluation during his/her appraisal visit.

C. The team should structure its presentation to address significant concerns, the classification of these concerns and the perceived basic causes underlying the concerns. The EH Senior Manager leads off the discussion at the close-out meeting by discussing his/her views of the overall safety posture of the facility based upon the appraisal results. The Team Leader discusses what he/she perceives to be the underlying or common causes for the major concerns, calling upon individual team members, as appropriate, to summarize or clarify specific findings and concerns. The entire presentation at the close-out meeting must be limited to summarizing and, if questions are raised, clarifying the findings and concerns. Evaluations or judgments regarding the adequacy or quality of the facility's program or performance are not to be expressed, and recommendations or suggestions for action to change the program are not to be offered.

D. In the close-out meeting, it will be made clear to contractor management that, while the findings and concerns have been presented to them by the team, the performance evaluation based upon these concerns will be developed by EH management.

E. A draft of the team's report documenting the findings and concerns, and noteworthy practices, will be provided to both the operations office and contractor at the time of the close-out meetings. Also, a separate document may be prepared to record team observations not considered significant enough to be included as concerns in the team's report. These observations should normally be expressed as factual statements (e.g., Many extension cords are in semi-permanent use in the facility and support buildings.). The observation document will be subjected to quality review, group review and Team Leader coordination similar to that given the team report.

F. The EH Senior Manager, or the Team Leader, will ask the contractor and operations office to comment to EH on the factual accuracy of the team's report within ten working days. It will be made clear that if comments are not received within that time period, the report will be considered factually accurate and will be issued in final form.

3.7 Follow-up

A. As soon as feasible after an appraisal is completed, the Team Leader will participate in a debriefing at Headquarters with Team Leaders, Assistant Team Leaders, Appraisal Coordinators, and EH management, called by the Director, Safety Inspections Division. The purpose of the debriefing will be to upgrade TSA team performance through sharing of views and experiences with generic applications.

B. EH management reviews the team's findings and concerns, using the diagnostic approach of Section 3.5A to assess the causes of the concerns and an expression of the facility's performance. From this review, the performance evaluation is developed for inclusion in the TSA Report. The TSA Report is prepared by the Team Leader for concurrence by the Director, Safety Inspection Division, the Director, Office of Safety Appraisals, the EH Senior Manager and the Associate Deputy Assistant Secretary. The appraisal team's report is included as Section III, FINDINGS, of the final TSA Report.

C. DOE 5482.1B requires that the TSA report be issued within 45 days of completion of the appraisal. The TSA Report will be transmitted by the Deputy Assistant Secretary for ES&H to the Operations Office Manager with a copy to the cognizant Program Secretarial Officer.

D. The management of the cognizant HQ program office will be offered a briefing on the conclusions of the appraisal. The EH Senior Manager generally will serve as spokesperson for this briefing although the Team Leader may also be called upon. (This individual would normally provide the background and orientation of the appraisal, and the Team Leader would present the technical results.) The responsible operations office is notified of this briefing.

E. The Office of Safety Compliance will evaluate the operations office's response to the TSA to determine whether it is satisfactory.

F. At an appropriate time during the year following completion of the appraisal, the Team Leader, with a reduced team, will visit the operations office and contractor to verify the status of improvements completed and underway. Before the visit, the Team Leader will solicit input from the appropriate EH organizations. After the visit, written conclusions will be forwarded to the Director, Office of Safety Compliance.

4.0 FUNCTIONAL AREAS AND PERFORMANCE OBJECTIVES

There are at present three components in the TSA program: management appraisals, operational appraisals, and quality assurance appraisals. For each of these, functional areas are identified that represent specific areas of managerial or technical activity. Within each functional area, performance objectives are defined that represent essential characteristics or conditions of an effective safety program. The criteria associated with each performance objective are intended to serve as guidelines for the appraisals. Appendix A provides the functional areas, performance objectives, and criteria for the Technical Safety Appraisals.

The criteria listed do not address every activity that might be relevant to a performance objective. Therefore, meeting all criteria does not necessarily ensure that the performance objective is fully met. Conversely, a specific facility might achieve the performance objective without meeting all criteria.

In part, because of the various ways in which the performance objective can be met, technical safety appraisals emphasize the performance objectives rather than the criteria. The methods for determining whether a criterion is met are not given. Consequently, considerable expertise and judgment is required to be exercised in conducting the appraisals. The use of existing detailed performance assessment methods, such as the Management Oversight and Risk Tree (MORT) approach, is strongly encouraged within the framework of the performance objectives.

Both management and operational TSAs are operationally focused and performance oriented. They deal with the safety culture of the facility, how safely it is being operated, and the condition of its documentation and equipment. The design of the facility and its process systems is presumed, for purposes of the management and operational TSAs, to permit safe operation. This is based on the presumption of an appropriate selection and application of design standards by the architect-engineer and the operating contractor, and of appropriate independent reviews by DOE or its predecessor agencies of the design, the construction activities, and the Safety Analysis Report.

Quality assurance TSAs assess the characteristics of the facility's quality assurance program and the way it is being implemented. Although the quality assurance TSAs have a broad perspective, covering the overall quality assurance program of the facility, the relevance and effectiveness of its application to safety is essential in the context of this manual.

DIVISION OF SAFETY INSPECTIONS
TECHNICAL SAFETY APPRAISAL PLAN

FACILITY:
OPERATIONS OFFICE/CONTRACTOR:
PRE-APPRAISAL VISIT DATES:
ORIENTATION VISIT DATES:
APPRAISAL VISIT DATES:
PREVIOUS TSA OR AUDIT DATE:
MOST RECENT FOLLOW-UP DATE:
FOLLOW-UP DATE:
OBJECTIVE OF THIS APPRAISAL:

TEAM COMPOSITION:

CLEARANCE LEVEL REQUIRED:

DISCIPLINE	TEAM MEMBER/SOURCE ORGANIZATION
TEAM LEADER	
ASSISTANT TEAM LEADER	
LEAD COORDINATOR	
COORDINATOR	
TECHNICAL EDITOR	
EH SENIOR MANAGER	

REMARKS:

UPDATES PREVIOUS SCHEDULE OF INPUT DATE:

INPUT DATE:
APPROVED:
BY:
DATE:

(Figure 1)

TEAM COMPOSITION, CONTINUED:

DISCIPLINE	TEAM MEMBER/SOURCE ORGANIZATION

TECHNICAL APPRAISAL OBSERVATION CARD

LOCATION _____ DATE _____

_____ TIME _____

OBSERVATION _____

_____

_____

_____

_____

_____

PREPARED BY _____ PASS TO _____

(Blue 3" x 5" card)

(Figure 2)

DOE/EH-0074

U.S. Department of Energy

Environment, Safety, and Health

Washington, D.C. 20545

Technical Safety Appraisal of the Tritium Systems Test Assembly Los Alamos National Laboratory

March 1989

(Figure 3)

DOE/EH-0064

U.S. Department of Energy
Environment, Safety, and Health

Technical Safety Appraisal of the EBR-II Argonne National Laboratory - West

June 1988

Printed on Verige Blue Cover Stock Paper.

(Figure 4)

TECHNICAL SAFETY APPRAISAL

TRITIUM SYSTEMS TEST ASSEMBLY

PREPARED UNDER
THE DIRECTION OF

Blake P. Brown
Team Leader

REVIEWED BY

Lewis G. Hulman
EH Senior Manager

APPROVED BY

Richard W. Starostecki
Deputy Assistant Secretary
Safety, Health and Quality Assurance

(Figure 5)

APPENDIX A

TSA Performance Objectives and Criteria

INTRODUCTION

This document contains revised Performance Objectives and Criteria intended to serve as a working reference for the Department of Energy's Office of the Deputy Assistant Secretary for Safety, Health, and Quality Assurance in its Technical Safety Appraisals of the Department's nuclear facilities. The Performance Objectives are broad in scope. Each generally covers a single, well defined management area. The supporting Criteria are more specific in scope and typically describe a particular activity that are listed under each Performance Objective. Those proceeded by asterisk (*) must be addressed by the appraiser if they are applicable to the facility. These criteria address requirements of a DOE order, appropriate nuclear industry lesson-learned, appropriate NRC-licensed facility requirement, or appropriate industry standard.

Technical Safety Appraisals are operationally focused evaluations. As such, they deal with how safely a facility is being operated and the condition of its equipment. The design of the facility and its process systems to permit safe operation is presumed by the Technical Safety Appraisal process to be adequate. This is based on the presumption of an appropriate selection and application of design standards by the architect-engineer and the operating contractor, and of appropriate independent reviews by the Department or its predecessor agencies of the design, the construction activities, and the Safety Analysis Report.

The Criteria are results-oriented. The methods for determining whether any given criterion is met are generally not given. Thus, considerable thought and judgement is required in applying the Criteria. The use of existing detailed performance assessment methodologies, such as the Management Oversight and Risk Tree (MORT) approach, is encouraged within the framework of the Performance Objectives.

The Criteria listed do not address every activity associated with a Performance Objective. Therefore, meeting all Criteria does not necessarily ensure that the Performance Objective is fully met. Conversely, a specific reactor or nuclear process facility may achieve the Performance Objective without meeting all Criteria. For these reasons, Technical Safety Appraisals emphasize the Performance Objectives rather than focusing solely on the supporting Criteria.

It is anticipated that this document will be revised as experience with its use is gained.

PERFORMANCE OBJECTIVES AND CRITERIA FOR TECHNICAL SAFETY APPRAISALS

INDEX

OA. ORGANIZATION AND ADMINISTRATION

1. FACILITY ORGANIZATION
2. ADMINISTRATION
3. MANAGEMENT OBJECTIVES
4. CORPORATE SUPPORT
5. MANAGEMENT ASSESSMENT
6. PERSONNEL PLANNING AND QUALIFICATION
7. DOCUMENT CONTROL
8. FITNESS FOR DUTY

OA.1 FACILITY ORGANIZATION

PERFORMANCE OBJECTIVE

Management should organize and manage the facility's work, programs, and resources so that safety and health are an integral part of the personnel duties and requirements are consistently implemented.

CRITERIA

*1. The organizational structure is well defined and understood.

*2. The responsibilities and authorities and the extent of freedom-to-act are well defined for all positions.

*3. Task assignments are consistent with regularly defined duties and personnel performing the tasks are qualified.

4. Facility personnel understand their authority, responsibilities, accountabilities and interfaces with supporting groups, including contractor management.

5. Decisions relative to safety and health are made at an appropriate level.

6. Procedures clearly define the responsibility for safety-related decisions and provide for the escalation of matters in an appropriate time frame.

7. A system is in place to provide a ranking of safety considerations that is based upon priorities established by site management.

8. In instances where interpretation of safety considerations, Technical Specifications/Operational Safety Requirements violations or safety-related issues are necessary, higher levels of contractor management and the DOE field office are notified. After appropriate review, direction is given from DOE field office or contractor management.

9. The facility personnel are organized so that integration of internal work activities can occur effectively.

10. Employees and subcontractors understand the safety significance and impact of their work activities on interfacing organizations.

11. Employees and subcontractors understand the level of cooperation with interfacing organizations necessary for the safe performance of activities at the facility.

12. Management is proactive in addressing safety-related issues.

13. Management promotes safety programs through sponsoring and attending safety meetings.

14. Management directives and other forms of management information flow effectively and quickly through formal channels in the organization.

15. Information from lower levels related to safety concerns flows quickly and efficiently to the appropriate level of management, and management acts responsively in taking steps to resolve concerns.

16. Work is distributed through the organization in a logical fashion, grouping activities according to expertise requirements and according to an effective flow of information.

17. Workload is evenly distributed. Spans of control are appropriate for effective control of priorities and objectives. Management levels are appropriate for effective control of priorities and objectives.

OA.2 ADMINISTRATION

PERFORMANCE OBJECTIVE

Administrative programs and controls are in place to assure policies concerning health, safety and quality are administered through-out the facility.

CRITERIA

*1. A documented and approved quality assurance plan which meets the requirements of DOE 5700.6B and program specific requirements (such as the 18 elements of ANSI/ASME NQA) is employed by the facility.

*2. Persons performing health, safety and quality reviews are functionally detached from the area being reviewed and have no known conflicts that would sacrifice an independent and objective health, safety or quality review.

*3. Well defined functions for safety review are separate and independent from line functions.

*4. An effective program for reporting unusual occurrences exists. The threshold for classification of unusual occurrences is appropriate and interpreted consistently.

5. The Quality Assurance Program addresses all safety and personnel protection related functions including operational, technical and administrative functions.

6. Independent quality reviews are routinely performed.

7. Administrative controls for safety-related work are well defined in each functional area.

8. An effective corrective action program for safety-related issues exists. Records are updated and activities are tracked through completion.

9. Effective programs for reporting safety violations, employee concerns, and conditions adverse to quality exist, and are encouraged and supported by management.

10. Staffing and resources are administered appropriately.

11. Employees participate in formulating and executing safe work practices so that the individual worker feels responsible for his own safety and the safety of co-workers.

OA.3 MANAGEMENT OBJECTIVES

PERFORMANCE OBJECTIVE

Facility management objectives should ensure commitment to safe operation, including enforcement of approved work practices and procedures.

CRITERIA

*1. Objectives indicate a strong commitment to a safe and high-quality operation and safe work practices.

2. Specific objectives that address and emphasize the contractor's and DOE's commitment to safety are established in each organizational unit and take priority over non-safety-related objectives.

3. Objectives address long-range goals for safe operation and areas where improvement is needed.

4. Objectives are stated in measurable terms. Where appropriate, action plans with specific milestones are used to aid in tracking progress toward objectives.

5. Contractor, site, facility, and unit objectives are consistent and complementary.

6. Responsibilities are assigned for achievement of specific objectives. Assignments reflect actions needed by each contributing department to achieve common objectives.

7. Personnel understand the actions necessary, within the scope of their duties and responsibilities, to achieve the objectives.

8. Managers and supervisors employ the objectives to achieve improvements.

9. A safety performance information feedback system is operated to keep facility supervision and employees appraised of progress toward achieving objectives.

10. Management reviews are conducted periodically to assess progress toward achieving objectives.

11. Safety goals are updated and published annually. In safety meetings, employees and management discuss how goals can be met.

OA.4 CORPORATE SUPPORT

PERFORMANCE OBJECTIVE

Corporate interest and support for safe operation should be evident.

CRITERIA

*1. Contractor corporate policy demands adherence to safety rules and regulations and demands adequate prioritizing and protection of safety interests where there may be conflict with cost, schedule or other interests.

*2. Feedback on the status of compliance with safety standards and requirements is provided to facility management.

*3. There is an effective and specified chain of communications in both directions between corporate and facility management.

4. Timely and effective corporate management action to correct deficiencies in resources is taken when necessary.

OA.5 MANAGEMENT ASSESSMENT

PERFORMANCE OBJECTIVE

Management and supervisory personnel should monitor and assess facility activities to improve performance in all aspects of the operation.

CRITERIA

*1. Timely and effective action is taken to track and correct identified deficiencies and to prevent recurrence by addressing their basic causes and related generic problems.

*2. Unusual events are reported to and reviewed by management for safety implications. Events are classified as unusual events in compliance with DOE 5484.1 and DOE 5000.3.

*3. An effective system exists to disseminate information necessary for safe operation directly to employees.

*4. Effectiveness of implementation of the quality assurance program is determined through independent audits.

5. Managers and supervisors personally take part in monitoring and assessing facility activities.

6. Managers and supervisors conduct frequent facility tours and observe work activities.

7. Management and supervisory assessment and improvement efforts are performance-oriented and are conducted in a manner that reinforces the line functions of managers and supervisors.

8. Selected operational data reflecting facility performance are analyzed and trended, and the results are forwarded to appropriate levels of management and incorporated into the age-related degradation program. Data are reviewed and necessary corrective actions are taken by management.

9. An internal audit system exists which includes assessments of the technical adequacy of the activities undertaken to comply with procedural requirements.

10. Scope and frequency of audits are defined and followed.

11. Audit objectives are sufficient to identify critical areas of concern.

12. Staff performing assessments and audits are appropriately trained and possess the expertise necessary to perform an adequate review.

13. Staff performing reviews and assessment demonstrates objectivity in analyzing issues important to safety.

OA.6 PERSONNEL PLANNING AND QUALIFICATION

PERFORMANCE OBJECTIVE

Personnel programs should ensure that appropriate job qualification requirements or position descriptions are established for all facility positions that affect safe and reliable operation.

CRITERIA

*1. Job qualification requirements are periodically reviewed, evaluated, and revised as necessary.

2. A personnel management and acquisition program is effectively implemented.

3. Timely action is taken to anticipate and fill vacancies.

4. Selection of personnel to fill vacancies is based on merit and ability.

5. Position incumbents meet the prescribed job qualification requirements.

6. Appropriate career advancement programs are used to develop the management, supervisory, and technical expertise of personnel.

7. Long-range staffing plans are developed.

8. An employee performance appraisal program is effectively used to enhance individual performance.

9. Facility personnel are provided job-related operational experience through coordinated training involvement with other facilities operated by the contractor and other DOE contractors.

10. Safety performance and commitment to safety are clearly included as factors in employee appraisals.

OA.7 DOCUMENT CONTROL

PERFORMANCE OBJECTIVE

Document control systems should provide correct, readily accessible information to support facility operations.

CRITERIA

*1. The facility Safety Analysis Report and Technical Specifications/Operational Safety Requirements are current, and mechanisms are in place for updating whenever additional analyses, facility changes, etc., occur.

2. Receipt, review,and distribution of documents from sources outside the facility are properly controlled.

3. Preparation, review, approval, and distribution for use of documents originated within the facility are properly controlled and timely.

4. Instructions to the staff are kept current, and superseded or voided documents are removed from use.

5. Necessary documents are readily available at appropriate locations in the facility and on site.

6. Instructions and other documents are properly stored and readily retrievable.

7. Policies and procedures specifying adequate controls over safety-related documents are in place and followed.

8. Vital records are stored in fire proof vaults.

9. A system is in place that assures safety-related documents are maintained in accordance with policies and procedures.

OA.8 FITNESS FOR DUTY

PERFORMANCE OBJECTIVE

A facility Fitness For Duty Program should be capable of identifying persons who are unfit for their assigned duties as a result of drug or alcohol use, or other physical or psychological conditions, and should provide procedures to remove them from such duty and from access to vital areas of the facility pending rehabilitation or remedial actions.

CRITERIA

*1. Managers and supervisors are trained in techniques used to identify and handle personnel suspected of being unfit.

2. A clear, written policy on drug and alcohol use is available to all employees, contractors and visitors.

3. Senior management support for the program is evident to all levels.

4. Prospective employees are appropriately screened before assignments to work.

5. All employees are periodically provided with and have knowledge of appropriate information on drugs, alcohol, and other important aspects of the program.

6. Personnel are encouraged to report drug and alcohol abuse or other physical or psychological conditions that could impair fitness for duty.

7. An employee assistance program is available to all personnel and is well publicized.

8. Compliance with facility policy on fitness for duty is a condition of subcontractor access to the facility.

OP. OPERATIONS

1. ORGANIZATION AND ADMINISTRATION
2. CONDUCT OF OPERATIONS
3. OPERATIONS PROCEDURES AND DOCUMENTATION
4. FACILITY STATUS CONTROLS
5. OPERATIONS STATIONS AND EQUIPMENT
6. OPERATOR PERFORMANCE
7. SHIFT TURNOVER
8. HUMAN FACTORS

OP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

Operations organization and administration should ensure effective implementation and control of operations activities.

CRITERIA

*1. The operations organizational structure is well defined and understood.

2. Responsibilities and authority of each management, supervisory, and professional position in operations are well defined.

3. Interfaces with supporting groups are well defined.

4. Administrative controls are employed for activities that affect safe and reliable facility operation. Examples of such activities include equipment isolation, use of jumpers and lifted leads, posted operator aids, and shift turnover.

5. Goals and performance indicators are established and used to improve operations performance.

6. For new processes or facilities, sufficient permanent operations personnel are involved in startup activities to obtain experience and skills necessary to support future facility operations.

7. Effective means, such as a required reading file and/or shift meetings, are used to ensure that appropriate individuals are made aware of important information related to their job assignment.

8. Facility policies and operating guidance stress the significance of activities which change important process conditions, or reactivity (multiplication) and the need to conduct such activities only with proper authorization and approved procedures.

9. Operations personnel have regularly defined duties and are qualified to perform assigned duties

OP.2 CONDUCT OF OPERATIONS

PERFORMANCE OBJECTIVE

Operational activities should be conducted in a manner that achieves safe and reliable operation.

CRITERIA

*1. Control room activities are conducted in a business-like and professional manner.

*2. Control room access is limited to appropriate personnel, and access to the "controls" area is restricted to authorized personnel.

*3. Supervisors and managers monitor operations to identify and correct problems and to ensure adherence to facility policies and procedures.

*4. Operators perform in a timely manner and document all tests and measurements required by Technical Specifications/Operational Safety Requirements for which they are responsible.

*5. There is a system in place to ensure that the facility is in compliance with all Technical Specifications / Operational Safety Requirements.

*6. Operators comply with all Technical Specifications / Operational Safety Requirements under their control.

7. Operators are attentive and responsive to facility and equipment parameters and conditions.

8. Safety systems are maintained operable and are reliable to the maximum extent possible. When safety systems are bypassed, the length of time this condition exists is minimized and within Technical Specifications / Operational Safety Requirements limitations, and controls are established to ensure that facility safety is maintained. Safety systems and functions are not bypassed or placed out of service without supervisory approval.

9. The operating conditions of facility equipment are effectively monitored, and appropriate corrective action is initiated, when required.

10. Measurements, readings, and backup instrumentation, are used, as appropriate, when normal instrumentation is found to be defective or out of tolerance.

11. Operator shift duties are limited to activities that support safe and reliable operation.

12. Feedback is used to verify transmitted information.

13. Facility evolutions and testing are properly authorized by management and are controlled by operations personnel.

14. After each forced process or reactor shutdown, root causes are determined and corrected prior to restart. Restart criteria and decision authority are established and followed.

15. Shift logs are maintained, are informative, and include information on all off-normal operating conditions and are read and noted by appropriate oncoming shift personnel.

16. Operations management adheres to a documented and approved Quality Assurance Plan, and monitors the effectiveness of its implementation.

17. Written policies direct how trainees may be used to support operations activities. These policies are followed. The policies also address how trainees are controlled to prevent errors that could adversely impact the facility.

OP.3 OPERATIONS PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE

Approved written procedures, procedure policies and data sheets should provide effective guidance for normal and abnormal operation of a facility.

CRITERIA

*1. The Safety Limits and Limiting Safety System Settings selected adequately bound the operation. They are addressed in each appropriate procedure.

*2. Sufficient time is provided for training before significant procedure changes or system modifications are put into effect.

*3. Records of fissile material movements within the facility accurately indicate the situation at any instance, and are auditable in accordance with DOE 5480.5, Section 11.

4. The preparation, review, approval, and revision of operating procedures and data sheets are properly controlled, auditable, and checked for impact on safe operation.

5. The guidance of applicable source documents is incorporated into facility operating procedures (e.g., contractor ES&H policy and guidelines, and vendor technical manuals).

6. Procedures are clear, concise, and contain adequate information for users to understand and perform their duties effectively. For example:

   - Portions of or steps from other documents that are used or referred to when performing a procedure are specifically identified in the procedure;

   - Special equipment or tools required for safe performance are specified; and

   - The use and placement of notes and caution statements to promote error free performance is appropriate.

7. Emergency and abnormal operating procedures effectively guide the operations staff in responding to single and multiple events. Alarm response, abnormal, and emergency operating procedures are linked to and consider the Emergency Plan.

8. Procedures are verified and validated prior to use.

9. A policy governing the use of procedures is implemented. The policy includes the following:

   - Action to be taken when procedures are found to be inadequate for the intended tasks or when unexpected results occur;
   - Directions for procedures which are to be used as general guidance, which are to be followed step by step, or which require sign off for each step;
   - Identification of procedures required to be in hand when performing the activities to which they pertain;
   - Action to be taken if procedures conflict or do not contain adequate guidance; and
   - Operator authority to deviate from written procedures during an emergency if necessary to protect personnel and equipment or to maintain a safe condition in the facility.

10. Temporary changes to procedures, if used, are controlled to ensure the following:

    - Appropriate review and authorization prior to use;
    - User awareness of applicable temporary changes; and
    - Timely cancellation or incorporation into permanent procedures.

11. Procedures are readily available and clearly identified.

12. Documents, drawings, and other operator references are readily available, authorized, and properly controlled.

13. (For reactors only) Startup procedures require prediction of the control rod positions at criticality (where feasible) and specify action to be taken if actual control rod positions at criticality are not within predicted limits.

14. Facility operating records contain data for evaluating unusual occurrences and trends that could lead to procedure and equipment changes. These records are included as part of the data base used for the age-related degradation program at the facility.

15. Limiting Conditions for Operation in the Technical Specifications / Operational Safety Requirements specify appropriate bounding restrictions for the operating conditions indicated.

16. Supplemental operating information, such as posted diagrams or posted special instructions, are properly authorized, dated, and otherwise controlled.

OP.4 FACILITY STATUS CONTROLS

PERFORMANCE OBJECTIVE

Operations personnel should know the status of the systems and equipment under their control, should know the effect of non-operational systems and equipment on continued operations, and should ensure that systems and equipment are controlled in a manner that supports safe and reliable operation.

CRITERIA

*1. Policies and procedures defining controls for determining facility status are implemented. Adherence to Technical Specifications / Operational Safety Requirements is stressed. Provisions for special situations such as refueling, extended outages, and correction of abnormal conditions are included.

*2. The operating conditions of facility equipment are effectively monitored, and appropriate corrective action is initiated when required.

3. Check sheets or other comparable means are used to ensure that proper conditions are established for each mode of facility operation, including mode changes.

4. A configuration control system requires facility management approval for changes to equipment or process components.

5. Equipment status changes are appropriately documented and communicated to appropriate shift personnel in a timely manner.

6. Activities affecting the status of installed systems and equipment are authorized by appropriate operations personnel and any restrictions noted which affect operations.

7. The number of alarms that are normally in a lighted or alarmed condition during operation is minimized. Operators are able to differentiate between annunciator lights providing status information and those providing indication of an alarm condition.

8. Defective or out of tolerance instrumentation, alarms, and controls are identified and properly labeled, and corrective measures are taken in a timely manner.

9. Logkeeping is timely, accurate, and adequately reflects facility activities and status.

10. Locks and tags are effectively employed for personnel and equipment protection and for configuration control.

11. Procedures are implemented to effectively control the placement of

caution, warning, information, and other tags installed on equipment. Procedures should include the following:

- Tags are authorized by a senior operations or management individual;
- Guidance is provided for determining boundary points and vent/drain paths, where applicable;
- Tags of a procedural nature do not conflict with approved operating procedures or Technical Specifications / Operational Safety Requirements; and
- Independent verification of tag placement/component alignment and tag removal/component realignment by qualified personnel.

12. Lock and tag status is periodically reviewed to ensure the following:
    - The scope of the lockout and tagout is still applicable;
    - The locks and tags are still needed;
    - Each tag is placed on the proper component;
    - Tagged equipment is in the proper position;
    - Only authorized tags are present on components; and
    - The information on tags and tagout sheets is accurate, complete, and legible.
13. An independent verification of component position is performed for safety-related and other important systems and equipment positioned after maintenance or testing.
14. When appropriate, the sequence for conducting equipment lineups is specified and justified.
15. Procedures are implemented to control the placement, removal, and periodic review of temporary modifications, such as electrical jumpers, lifted leads, mechanical jumpers, hoses, pipe blanks, and spool pieces. Procedures should include a requirement to note such temporary modifications in the log book each shift.
16. Personnel participating in tests are briefed on current and projected testing activities and on status changes.

OP.5 OPERATIONS STATIONS AND EQUIPMENT

PERFORMANCE OBJECTIVE

Control stations and facility equipment should effectively support facility operation.

CRITERIA

*1. Physical characteristics, environmental conditions, and maintenance of facility control stations support safe and reliable operation.

*2. Equipment needed for operational activities is readily available to shift personnel.

3. Communication equipment is reliable and provides necessary facility coverage. Portable communications equipment is used by personnel whose work takes them outside the range of facility communications systems.

4. Facility equipment is accessible for operation and monitoring. Fixed local area hoists, ladders, and work platforms are provided, as needed.

5. Facility equipment and associated components are properly labeled with sufficient information so that they can be easily identified by personnel.

6. Cleanliness and order are evident.

OP.6 OPERATOR KNOWLEDGE AND PERFORMANCE

PERFORMANCE OBJECTIVE

Operator knowledge and performance should support safe and reliable operation of the equipment and systems for which he/she is responsible.

CRITERIA

*1. Operators exhibit constant vigilance for and are capable of diagnosing off normal and emergency conditions in their areas of responsibility.

2. Operators complete formal qualification before operating independently. Supervisors make shift assignments in consideration of the qualification status of all shift personnel.

3. Operator knowledge is evidenced by an appropriate understanding of areas important to assigned duties, such as:

   - Facility systems and components;
   - Facility procedures and operating practices;
   - Facility process and control; and
   - Facility policies and procedures regarding changes in process variables/reactivity.

4. Operators follow procedures and are aware of recent procedure changes and facility modifications, both permanent and temporary.

5. Operators have a clear awareness of the potential for process disruption from unauthorized or improper changes in process variables.

6. Operators follow good operating practices in conducting operations, including industrial safety and radiological protection.

7. Supervisors observe operator proficiency and performance, including procedure usage and compliance, and give instruction when necessary.

8. Operators are knowledgeable in appropriate lessons learned from industry and from in house operating experiences, and of the role of complacency in generating the incidents from which lessons are learned.

9. Operators exhibit an attitude and approach that reflect an awareness of abnormalities, unusual conditions or trends, and a determination to inquire into and follow up on indications of abnormalities and unusual conditions or trends.

10. Each operating shift crew functions effectively as a team in handling routine and emergency situations and evolutions.

11. Operators exhibit knowledge and understanding of the requirements in Technical Specifications / Operational Safety Requirements and procedures which implement these requirements. They demonstrate a questioning attitude concerning abnormal indications.

OP.7 SHIFT TURNOVER

PERFORMANCE OBJECTIVE

Turnovers conducted for each shift station should ensure the effective and accurate transfer of information between shift personnel.

CRITERIA

*1. Each shift station uses a check sheet or similar method to guide the turnover process. Items covered by the check sheet include:

- Equipment removed from service, degraded or undergoing maintenance;
- Operations and/or testing that are completed, or in progress or scheduled;
- Review of log or computer entries for the previous shifts;
- Off-normal conditions, alarms, temporary procedures, safety documentation changes which are new since last time on shift; and
- Review of status of any temporary modifications such as electrical jumpers, lifted leads, etc.

2. Turnovers include a general review of the control boards and panels.

3. Supervisor turnovers include a review of those administrative records necessary to ensure an adequate transfer of equipment status information.

4. Overlap between incoming and outgoing operators and supervisors is adequate to permit the orderly transfer of necessary information.

5. For those facilities where operations are conducted for only one shift per day, an effective means is in place to ensure that equipment is placed in a safe condition, and that backshift security/custodial/maintenance personnel can properly respond to abnormal conditions.

6. Any off-normal situation noted on a check sheet(s) which impacts safe operation has a time of occurrence, time to be returned to normal condition, or required action to be taken to stabilize the situation.

OP.8 HUMAN FACTORS

PERFORMANCE OBJECTIVE

Human factors considerations should be incorporated in the design, layout and operation of the facility in order to facilitate operator control, information processing, and the recognition and proper response to alarms, instruments, and other equipment.

CRITERIA

*1. Controls and their associated displays are grouped in close proximity to each other to eliminate ambiguity and facilitate ease of operation.

*2. Status and alarm indicators are arranged and coded to allow rapid and accurate differentiation.

*3. Labeling of controls and displays is consistent, and is legible. Information on component labels is consistent with information found in facility procedures. Abbreviations and nomenclature used are standardized and understood by facility personnel.

*4. Illumination levels in the facility are adequate for both normal and emergency lighting systems.

*5. A reliable communications system is available that is compatible with the acoustic characteristics and ambient noise levels of the facility.

*6. Instructions and procedures are user-friendly/easy to understand and interpret.

7. If all controls are not within operator's reach envelope, ladders, platforms or other aids are provided.

8. Coding conventions used (color, shape, size, position) are consistent throughout the facility.

9. Multiple alarms can be easily distinguished and identified when presented simultaneously.

10. Instruments are color banded to indicate normal and abnormal ranges of operation.

11. Restricted clearances are adequately marked and identified.

12. Clearances are adequate for personnel access in emergency equipment (SCBA, protective clothing).

13. Marking/labeling on piping is clear and legible.

14. Operational aids/special tools are formally approved, tested, and controlled, and are consistent with written requirements/procedures.

15. A method is established for promptly replacing lost or damaged component label..

MA. MAINTENANCE

1. ORGANIZATION AND ADMINISTRATION
2. FACILITY MATERIAL CONDITION
3. CONDUCT OF MAINTENANCE
4. PREVENTIVE MAINTENANCE
5. MAINTENANCE FACILITIES, EQUIPMENT,AND MATERIAL
6. PLANNING, SCHEDULING, AND WORK CONTROL
7. PROCEDURES AND DOCUMENTATION
8. HISTORY

MA.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

Maintenance organization and administration should ensure effective implementation and control of maintenance activities.

CRITERIA

*1. The maintenance organizational structure is well defined and understood.
*2. Resources are allocated and established to accomplish assigned tasks.

*3. Responsibilities and authority of each management, supervisory, and professional position are well defined.

*4. Personnel clearly understand their authority, responsibilities, accountabilities, and interfaces with supporting groups.

*5. Policy is established for overall direction of the maintenance program.

*6. Standards are established for conduct of the maintenance program, including such things as cleanliness, bolting, use of sealants, and containment of hazardous and radioactive materials.

*7. Administrative controls and procedures are employed for all maintenance activities that affect safe and reliable operation. Examples of such activities include isolation of equipment, scheduling of corrective and preventive maintenance, use of tools and lifting equipment, and use of measuring and test equipment.

8. The organization operates as a cohesive unit to accomplish the maintenance function in harmony with facility operations, coordinating with safety, radiological control, and other support groups.

9. Performance appraisals are effectively used to enhance individual performance.

10. Procedures are established for administrative control of maintenance program elements.

11. Maintenance policy and administrative procedures receive proper approval and periodic review and are administered as part of a document control system.

12. Maintenance, craft, and technical personnel are actively encouraged and supported to develop improved methods of meeting safety and quality goals.

13. Indicators of maintenance performance are established and periodically assessed to enhance maintenance effectiveness.

14. Management presence and oversight are apparent by participation in plant inspections and review and observation of the maintenance program.

15. Management is able to effectively control maintenance staffing and assignment (to best utilize available manpower, training, qualification, and special skills and area knowledge).

16. Mechanisms for establishing and approving standards and procedures for maintenance activities are in place; also, a process for periodic updating of these procedures and standards exists.

17. Maintenance personnel have regularly defined duties and are qualified to perform assigned duties.

MA.2 FACILITY MATERIAL CONDITION

PERFORMANCE OBJECTIVE

The material condition of components and equipment should be maintained to support safe and effective operation of the facility.

CRITERIA

*1. Mechanical systems and equipment are in good working order.

*2. Good lubrication practices are evident.

*3. Fluid system leaks are minimized, monitored, and assessed for impact on safe operations.

*4. A method is established to indicate that material deficiencies have been identified and are entered into the work control system.

*5. Instrumentation, controls, and associated indicators are operable, and are calibrated as required.

*6. Electrical and electronic equipment is operable and appropriately protected from adverse environmental conditions.

*7. Mechanical operators, fasteners, and supports are in place and operable.

*8. Equipment, systems, and structures required for safe facility operation are designed for seismic and other external loads (i.e., tornadoes, aircraft impact, missiles) considerations.

*9. Equipment, structures, and systems are properly preserved and insulated.

*10. A facility inspection program is established per DOE 4330.2, where members of management, including maintenance management, identify and assure correction of deficiencies related to safety, material condition, and housekeeping, thus ensuring that these practices conform to management's standards and expectations.

11. An overview of equipment failures, out of service equipment, alarms and indicators showing failed equipment and instrumentation, and overall facility operating versus shutdown times assures that the maintenance program is effective in the overall sense.

12. Documentation of maintenance provided is available.

13. A process for measuring the degradation of standby systems is provided.

MA.3 CONDUCT OF MAINTENANCE

PERFORMANCE OBJECTIVE

Maintenance should be conducted in a safe and effective manner to support facility condition and operation.

CRITERIA

*1. Work is properly authorized and controlled.

*2. Maintenance managers and supervisors take an active role in minimizing exposure of their personnel to radioactive and hazardous materials.

*3. Radioactive and other hazardous materials are contained at the source using enclosures and glove boxes to minimize the spread of the material and to minimize worker exposure.

*4. Procedures are used and followed, as required by facility policy. Procedures are updated periodically.

*5. Maintenance personnel are kept knowledgeable of applicable lessons learned from past and current facility and industry experiences.

*6. Maintenance practices, as a minimum, include the following:

- Proper tools are employed;
- Foreign materials and contaminants are excluded from open systems and equipment;
- Parts and components are captured and controlled;
- Work sites are orderly; and
- Work authorizations, procedures, and permits are at the job site.

*7. Lock and tag procedures are implemented to protect personnel and equipment during the installation and maintenance of equipment or to protect the balance of systems from equipment that is temporarily unsafe to operate. These procedures ensure in practice that:

- Proposed lock and tag alignments are prepared by qualified individuals;

- The adequacy of lock and tag alignments is verified by someone separate from the individual who prepared the alignment, using current (as-built) facility prints or other definitive and current documentation;

- Locks and tags are authorized by a senior operations or utility individual;

- Lock and tag alignments are performed by persons responsible for and knowledgeable of the affected systems and lockout and tagout procedures;

- The sequence of lock and tag placement and removal is specified when appropriate;

- The lock and tag status is verified by the person performing or supervising the work on locked-out or tagged-out equipment before the work is commenced;

- Danger tags are uniquely identifiable from other tags in use at the facility;

- Status indications, controls, switches, and labels are not obscured by tags; and

- Proposed lock and tag alignments are consistent with approved procedures and Technical Specification / Operational Safety Requirements.

*8. Bypassing or deactivation of safety-related systems, controls, interlocks, and equipment for testing, calibration, or maintenance is done in accordance with approved procedures and Technical Specifications / Operational Safety Requirements, which define requirements for facility conditions and restoration to service. Such bypassing and deactivation and the subsequent restoration to service are documented and verified.

*9. Appropriate maintenance personnel are aware of post-maintenance test requirements and results and take corrective action, as necessary.

*10. Certification of the satisfactory completion of all maintenance work is required, and the identity of the certifier is traceable.

*11. Maintenance rework is identified and periodically reviewed for generic implications, and appropriate corrective action is taken, as necessary, to minimize rework.

*12. Maintenance is performed by or under the direct supervision of personnel who have completed applicable formal qualification associated with the tasks to be performed, and such qualification is documented and understood.

*13. Maintenance personnel knowledge is evidenced by an appropriate understanding of areas such as the following:

- That safety is the first priority, placed before production or schedule;
- Industrial safety;
- Radiological protection and ALARA;
- Quality work, cleanliness, and housekeeping practices;
- Maintenance policies, standards, and procedures;
- Specific technician work practices;
- General facility layout;
- Purpose and importance of facility systems and major equipment; and
- Effect of work on facility systems.

*14. Maintenance personnel are capable of troubleshooting equipment problems in an effective manner. Appropriate support documentation such as as-built drawings and vendor manuals are available and used.

*15. Maintenance personnel are kept cognizant of facility policy and procedure changes that affect their activities.

16. Maintenance activities at the facility are under the direct control of the facility operator.

17. Maintenance personnel exhibit an attitude in approaching their tasks that results in quality workmanship as well as minimizing their exposure to radioactive and hazardous materials.

18. Maintenance personnel are attentive to identifying, and responsive to correcting, deficiencies with a goal of returning equipment/systems to an optimum material condition.

19. Managers and supervisors observe maintenance activities to identify and correct problems and to ensure adherence to facility policies and procedures.

20. Operations, safety, quality control, and radiological protection personnel are coordinated and involved appropriately in maintenance activities.

21. Pre- and post-job briefings are effectively used.

22. Subcontract personnel perform maintenance under the same controls and procedures, and to the same standards, as in-house maintenance personnel.

MA.4 PREVENTIVE MAINTENANCE

PERFORMANCE OBJECTIVE

Preventive maintenance should contribute to optimum performance and reliability of systems and equipment important to facility operation.

CRITERIA

*1. A preventive maintenance (PM) program is in existence which includes systems and equipment that affect safe and reliable facility operation.

*2. Inspection, lubrication, and maintenance are performed at appropriate intervals determined by vendor recommendations, operational experience, and Technical Specifications / Operational Safety Requirements, if applicable.

*3. The backlog of PM is minimized. PM is not waived or deferred for extended periods of time without management approval.

*4. Techniques such as vibration analysis and oil analysis are used to assess equipment performance.

5. Documentation of PM provides a record of work performed, associated data and, where appropriate, the condition of the equipment.

6. The effectiveness of the PM program is periodically evaluated at an appropriate management level, and the results are used to make program improvements.

7. The PM program includes provision for determining and mitigating the effects of age-related degradation of components and systems, including in-service inspections.

MA.5 MAINTENANCE FACILITIES, EQUIPMENT, AND MATERIAL

PERFORMANCE OBJECTIVE

Facilities, equipment, and material should effectively support the performance of maintenance activities.

CRITERIA

*1. Proper tools, equipment, and consumable supplies are available to support maintenance requirements.

*2. Maintenance shop fabrication areas provide for segregation of materials by type to prevent cross-contamination or use of wrong materials; e.g., stainless steel segregated from carbon steel.

*3. Maintenance facilities, equipment, and tools are maintained in good repair.

*4. Maintenance work areas are maintained in a clean and orderly condition.

*5. Contaminated tools are segregated from clean tools. Reuse is stressed, when feasible, and is supported by storage and tool control systems.

*6. The quality of stored equipment, repair parts, and material is maintained.

*7. Measurement and test equipment is calibrated and controlled to ensure accuracy and traceability. The calibration status is readily apparent.

*8. Appropriate safety devices and personnel safety equipment are provided, periodically inspected where necessary, and used.

*9. Standard instruments used in calibrations are appropriately controlled and have calibrations traceable to the National Institute of Standards and Technology where possible, or to other nationally recognized standards.

*10. A documented system is established to provide for periodic safety inspection of lifting, hoisting, and rigging equipment.

*11. Programs are implemented to order, receive, and issue proper parts and material for normal maintenance, outages, and modifications. Methods exist to ensure that stock levels are adjusted, as necessary, to meet maintenance needs.

*12. Material is inspected prior to acceptance and storage to ensure conformance to design requirements. Acceptance is documented and non-conforming items are clearly identified to prevent their use.

*13. The quality of stored equipment, parts, and material is maintained by preventive maintenance and environmental and shelf-life controls.

*14. Provisions are established for proper storage, segregation, and control of hazardous materials such as chemicals, reagents, explosives, and flammables.

*15. Materials subject to restricted use and distribution, such as certain sealants and chloride-bearing compounds, are controlled for use in the facility.

*16. Materials are stored and identified in a manner that results in timely retrieval of requested items.

*17. Safety-related parts and components are properly controlled, segregated, and identified in the storeroom.

*18. Proper engineering control and approval are obtained on any deviation from the design specifications for parts or material.

*19. Stock records are maintained, purchase orders are tracked, and safety-related parts are readily traceable from purchase order to installation.

*20. Parts and material are properly controlled, segregated, and identified during the interval between storeroom checkout and installation.

21. Maintenance facility size, location, and arrangement promote the safe and effective completion of work.

22. Work area lighting affords safe and efficient working and operating conditions.

23. Suitable storage is provided for tools, supplies, and maintenance equipment. Special tools, jigs, and fixtures are identified and stored to permit retrieval when needed.

24. Unserviceable tools and equipment are controlled to prevent use.

25. Suitable facilities are available to decontaminate tools and equipment.

26. Mechanisms are in place to provide for the expeditious procurement of parts and material on a high priority basis when needed.

27. A program is established for acquisition of replacement parts that are not available from the original supplier.

28. Receipt inspection and testing programs are in place for procurement of new parts to increase the probability that products will perform as expected. The engineering staff is involved in selection of procured parts, in determining the critical characteristics of the product that should be verified at acceptance, in determining the specific testing requirements applicable to the selected products, and in evaluating the test results.

MA.6 PLANNING, SCHEDULING, AND WORK CONTROL

PERFORMANCE OBJECTIVE

The planning, scheduling, and control of work should ensure that identified maintenance actions are properly completed in a safe, timely, and effective manner.

CRITERIA

*1. The work control system provides management with a ready means for determining the status of outstanding work orders and maintenance planning.

*2. There is a clear understanding that identified problems and deficiencies in equipment or systems important to safety are reported, evaluated, and corrected in a priority fashion.

*3. The backlog of work is effectively managed.

*4. All maintenance and modification work is initiated only after proper authorization on a work order.

*5. Work planning and scheduling includes considerations such as material, tool, and manpower requirements; prerequisites; interdepartmental coordination; safety considerations; quality control requirements; and actions needed to minimize exposures to radioactive and hazardous materials.

*6. The concept of ALARA, including cost-benefit, is emphasized in planning all work involving exposures to radioactive and hazardous materials.

*7. Maintenance scheduling is integrated into and coordinated with the overall facility schedule, which takes into consideration prerequisites, job site preparation, and other support groups.

*8. Proper work order packages are prepared for all work, with detail commensurate to the complexity of the work involved.

*9. Work packages include detailed instructions to safely and properly control each part of the job. Worker signatures are required for completion of at least major portions of the work and for recording data or measurements. Hold points for quality inspection, radiological controls protection checks, and review of data are provided.

*10. Safe work permits, radiological work permits, and other special safety-related permits such as those for welding and burning and for enclosed space entry, are required and copies are available at the job site for use by the workers.

*11. Post-maintenance requirements are clearly defined and include the following elements:

- Clearly written test instructions;
- Test acceptance criteria;
- Adequate test precautions and safety considerations;
- Test scope sufficient to verify the adequacy of work accomplished; and
- System and equipment restoration.

*12. Post-maintenance test results are documented and reviewed to ensure proper system/equipment performance prior to returning the system to service.

13. Management control of work is accomplished through the use of an effective priority assignment system.

14. Advance planning is established for scheduled and unscheduled outages, including considerations such as work priority, system conditions, length of outage required, pre-staging of documents and materials, and coordination of support activities.

15. The work to be accomplished is well defined by the work order.

16. The work order package identifies or includes:

- Applicable guidelines;
- Procedures;
- Special precautions to be followed when the work is on hazardous systems;
- Requirements associated with Technical Specifications / Operational Safety Requirements; and
- Any requirements for special surveillance to be performed.

17. After shutdowns, the principal managers, supervisors, and foremen meet for a critique where they discuss problems, mistakes, areas of poor performance, and places where the process can be improved during subsequent shutdowns.

18. Completed work control documents are reviewed to verify proper completion of administrative requirements and to identify preventive maintenance program adjustments that may be needed.

MA.7 PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE

Maintenance procedures should provide appropriate directions for work and should be used to ensure that maintenance is performed safely and effectively.

CRITERIA

*1. Maintenance records are retained and protected in accordance with DOE 1324.2

2. Maintenance procedures are prepared by well-qualified personnel, knowledgeable of proper maintenance standards and administrative procedures, and familiar with the systems, equipment, and facilities involved.

3. Records of previous maintenance on a particular system, component, or equipment are used to prepare for new work, especially with regard to safety or when dealing with potential exposure to radioactive or hazardous materials.

4. The preparation, review, approval, and revision of procedures and documents are properly controlled.

5. Procedures are verified prior to use or procedures are validated prior to use, whichever is practical.

6. Work procedures, drawings, vendor manuals, and reference materials, including posted job performance aids, used in support of maintenance, are technically accurate and up-to-date.

7. Procedures are readily available and clearly identified.

8. Procedures are clear, concise, and contain adequate information for users to understand and perform their activities safely and effectively and are related to Technical Specifications / Operational Safety Requirements, when applicable.

9. Portions or steps of other documents used or referred to when performing a procedure are specifically identified in the procedure.

10. Hold points for quality and radiological control checks are included in procedures as needed.

11. A policy governing the use of procedures is implemented. The policy includes:

    - Actions to be taken when procedures are found to be inadequate for the intended task or when unexpected results occur;
    - Action to be taken if procedures conflict or do not contain adequate guidance;
    - Directions for when procedures are to be used as general guidance, are to be followed step-by-step, or require sign-off for each step;
    - Identification of procedures required to be in-hand when performing the operation to which they pertain;
    - A feedback system to improve the procedure system; and
    - A formal system to periodically review procedures for relationship to Technical Specifications / Operational Safety Requirements, technical accuracy, human factors considerations, and the inclusion of in-house and industry operating experience.

12. Temporary changes to procedures, if used, are controlled to ensure the following:

    - Notification of appropriate operations management when used;
    - Appropriate review and authorization prior to use;
    - User awareness of applicable temporary changes;
    - Timely cancellation or incorporation into permanent procedures; and
    - Recorded in log books as to time made.

13. Special maintenance procedures are provided for equipment that is unusual, especially sensitive, or requires special maintenance skills or qualification.

MA.8 HISTORY

PERFORMANCE OBJECTIVE

Maintenance history should be used to support maintenance activities and optimize equipment performance.

CRITERIA

*1. Maintenance history records are maintained for systems, equipment, and components that affect safe and reliable facility operations.

2. Age-related degradation of systems, components, and structures is a consideration in the maintenance history system with provision to monitor material condition accordingly.

3. Maintenance records for age-related degradation are transmitted to appropriate parts of the organization as required by the facility program.

4. Maintenance work, including malfunctions, repairs, modifications, and post-maintenance inspection/test results, is effectively documented in the maintenance history program.

5. Maintenance history records are readily accessible.

6. Maintenance history records and operating experience are appropriately considered in planning for corrective maintenance, modifications, preventive maintenance, and predictive maintenance.

7. Maintenance history is utilized to identify and evaluate trends and persistent maintenance problems. Provisions are in-place to initiate appropriate corrective action where indicated.

8. Information related to the hazardous aspects of maintenance, such as high pressures, temperatures, or radiological, chemical, or other toxic hazards, is recorded for analysis and use in recurring work.

TC. TRAINING AND CERTIFICATION

1. ORGANIZATION AND ADMINISTRATION
2. REACTOR OPERATIONS
3. NUCLEAR FACILITY OPERATIONS OTHER THAN REACTORS
4. GENERAL EMPLOYEE/PERSONNEL PROTECTION TRAINING
5. MAINTENANCE PERSONNEL
6. CRITICALITY SAFETY
7. TRAINING FACILITIES AND EQUIPMENT
8. QUALITY CONTROL INSPECTOR AND NONDESTRUCTIVE EXAMINATION TECHNICIAN
9. RADIOLOGICAL PROTECTION PERSONNEL
10. TRAINING FOR SUPERVISORS, MANAGERS, AND TECHNICAL STAFF
11. SIMULATOR TRAINING/FACILITY EXERCISES

TC.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

The training organization and administration should ensure effective implementation and control of training activities.

CRITERIA

*1. For each work classification, training and qualification/certification requirements based on assigned job tasks are established.

*2. (Category A reactors only) Training programs for reactor operators and supervisors and other operating, maintenance, and support personnel are implemented in accordance with a DOE approved training plan.

*3. Records of each individual's training participation and performance are maintained (as applicable) in an auditable manner.

*4. Sufficient time is provided for training before significant procedure changes or system modifications are put into effect.

5. The organizational structure is well defined and understood, including the responsibilities and authority of all personnel involved in managing, supervising, and implementing training.

6. Resources are allocated and established to accomplish assigned tasks. Training staff possess the necessary technical knowledge, experience, and instructional and developmental skills.

7. Training staff personnel authority, responsibilities, accountabilities, and interfaces with other groups are clearly defined.

8. Classroom and individualized instruction are effectively presented, and instructor performance is routinely evaluated.

9. A training system is defined and implemented for accomplishing the following:

   - Assessing trainee entry-level knowledge and skills;
   - Identifying and documenting tasks to be included in training;
   - Developing and modifying programs;
   - Planning and scheduling training activities;
   - Conducting on the job training;
   - Administering and controlling examinations to minimize the possibility of compromise;

- Exempting personnel from training requirements;
- Providing remedial training;
- Maintaining current training materials; and
- Including lessons learned from in-house and industry operating experience (actual events should be used to reinforce learning).

10. Training programs are systematically improved to ensure trainees maintain the required skills and knowledge. Feedback from job performance is used to evaluate and refine training programs.

11. Training requirements for temporary employees, contract personnel, and transient workers are established and are appropriate for the tasks to be assigned.

12. Training personnel are actively encouraged and supported to develop improved methods of meeting training objectives and goals.

13. Learning objectives which specifically define the skills and knowledge expected upon training completion are provided to instructors and students.

14. Training materials are adequate to support learning objectives.

15. Training and retraining schedules are maintained to keep all personnel adequately qualified and/or certified.

16. Performance indicators are established and used to improve training performance.

TC.2 REACTOR OPERATIONS

PERFORMANCE OBJECTIVE

The operator and reactor supervisor training and certification programs should be based on DOE 5480.6 par. 8.e., as applicable, and should develop and improve the knowledge and skills necessary to perform assigned job functions.

CRITERIA

*1. Selection criteria for operators exist and are established based on job requirements.

*2. Initial training for reactor control room operators includes the following topics as appropriate to the requirements of the job:

- Facility systems training;
- Principles of reactor operation;
- Design features of facility;
- Operating characteristics and limitations;
- Instruments and control systems;
- Safety, fire, and emergency systems, including those used to control or mitigate accidents involving a severely damaged core;
- Engineered safety features;
- Normal, abnormal, and emergency operating procedures;
- Radiation monitoring systems and survey equipment;
- Radiological safety principles;
- Effects of experiments;
- Manipulation of reactivity controls;
- Heat transfer, fluid flow and thermodynamics, chemistry, and other fundamentals training applicable to the reactor and necessary to support the above topics;
- Facility policies, procedures, and standards of performance; and
- Technical Specifications.

*3. Initial training for reactor control room supervisors includes the above topics plus the following topics as appropriate to the requirements of the supervisory job:

- Bases for Technical Specifications (Safety Analysis Report);
- Accident assessment and control;
- Radiation hazards;
- Reactivity effects during experimental and maintenance activities;
- Fuel handling, burnup and reactivity;
- Alterations in core configuration;
- Administrative responsibilities associated with facility operation;
- Quality assurance principles; and
- Supervisory skills.

*4. On the job training requirements are identified, completed, and documented prior to unsupervised assignment to the associated tasks.

*5. The certification examinations (oral, written, and operating) are sufficiently comprehensive to verify that the trainee can properly perform assigned duties. The minimum acceptable grade on the written exam is specified in a certification policy statement. Certifications are made by senior line management or their designees; no individual is certified by his/her immediate supervisor.

6. Continuing training maintains and improves job-related knowledge and skills in areas such as the following:

- System and component changes;
- Procedure changes;
- Industry and in-house operating experience; and
- Selected items from initial training program with emphasis on seldom used knowledge and skills.

7. Recertification on abnormal operation procedures and emergency response is performed annually using written and oral exams as required by DOE 5480.6. All other requirements of ANS 3.1 1980 (Draft), Sec. 5 and DOE 5480.6 para. 8.c.(2) are recertified biennially using written, oral, and demonstration examinations.

8. Recertification is up-to-date and individuals who fail a recertification examination are taken off their normal duties until they successfully meet the recertification requirements.

9. Initial and continuing training programs for reactor support operators consist of classroom, simulator, laboratory, and/or on the job training as appropriate for the requirements of the job.

TC.3 NUCLEAR FACILITY OPERATIONS OTHER THAN REACTORS

PERFORMANCE OBJECTIVE

The nuclear facility operator and supervisor training and certification programs should develop and improve the knowledge and skills necessary to perform assigned job functions.

CRITERIA

*1. Selection criteria for operators exist and are established based on job requirements.

*2. Initial training for nuclear facility process operators includes the following as appropriate for the requirements of the job:

- Procedures - Normal and abnormal operating procedures, emergency actions, alarms, administrative controls, Operational Safety Requirements, and employee responsibilities,
- Radiological Safety and Control - Radiation hazards, monitoring, safety practices, control procedures, and terminology;
- Criticality - Criticality safety principles and control procedures;
- Chemical Safety and Control - Chemical safety principles and controls specific to the chemical operations being performed;
- Facility Operating Characteristics - Principal features, operating parameters, and Operational Safety Requirements of the facility, including the auxiliary systems;
- Principles of Nuclear Facility Operation - The processes and technical terminology for the chemical, physical, and metallurgical reactions;
- Safety and Emergency Systems - The kind of equipment, operating characteristics and procedures, and testing requirements of safety systems; and
- Instrumentation and Control - Types of instruments and control systems, including principles of operation and consequences of malfunctions.

*3. Initial training for nuclear process facility supervisors includes, in addition to the above, the following topics as appropriate to job requirements:

- Design, control, and operating limitations for the facility, including instrumentation characteristics, adjustment, operation, and facility console control mechanisms, and control room

manipulations;

- Bases for Operational Safety Requirements (Safety Analysis Report);
- Procedures for making design and operating changes, including changes in operating procedures;
- Nuclear and radiation theory, including details of fission process, neutron multiplication, source effects, and neutron poison effects; and
- Procedures, equipment, and facilities available for handling and disposing of radioactive materials, liquids, and equipment.

*4. On the job training programs are structured, and include appropriate performance measures.

*5. Written documentation of certification for all operators and supervisors is maintained. The certification examination is sufficiently comprehensive to verify that the trainee can properly perform assigned duties. The minimum acceptable grade is specified in a certification policy statement.

*6. Retraining and recertification is up-to-date and individuals who fail a recertification examination are taken off their duties until they successfully meet the recertification requirements.

*7. Recertification on abnormal operation procedures and emergency response is performed annually by means of written and/or oral exams. All other requirements of DOE 5480.5 are recertified biennially using written, oral, and demonstration examinations.

*8. Any waivers of training are documented and meet the requirements of DOE 5480.5.

9. Continuing training maintains and improves job-related knowledge and skills in such areas as:

- System and component changes;
- Procedure changes;
- Industry and in-house operating experience; and
- Selected items from initial training program with emphasis on seldom used knowledge and skills.

TC.4 GENERAL EMPLOYEE/PERSONNEL PROTECTION TRAINING

PERFORMANCE OBJECTIVE

General employee and personnel protection training programs should ensure that facility personnel, subcontractors and visitors have an understanding of their responsibilities and expected safe work practices, and have the knowledge and practical abilities necessary to effectively implement personnel protection practices associated with their work.

CRITERIA

*1. Programs are established and implemented for initial and continuing training.

*2. Continuing training maintains and improves job-related knowledge and skills and includes areas such as the following:

- Industry and in-house experience;
- Pertinent changes to procedures; and
- Emphasis on identified performance problems of workers and on infrequently used information.

3. Initial training develops job-related knowledge and skills in the areas listed in #2. above. (Radiological protection and industrial hygiene training emphasize those actions individuals can take to reduce their exposures to radioactive and hazardous materials during routine operations and emergencies):

- Facility organization and administration;
- Facility description;
- Occupational safety program and practices;
- Industrial hygiene;
- Radiological protection;
- Fire protection;
- Quality assurance and quality control;
- Facility/site security-emergency response; and
- Requirements for compliance with procedures and regulations/DOE orders.

4. Emphasis is placed, in both initial and continuing training, on presenting facility-specific characteristics problems that require individual awareness.

5. Knowledge and practical abilities are evaluated during initial training as follows:

   - Written examinations are used to determine the employee's level of knowledge, including the ability to describe actions to be taken by the individual in the event of a radioactive or hazardous material incident; and

   - Each individual required to enter radiologically controlled areas demonstrates the necessary proficiency in frisking, donning and removing protective clothing, reading pocket dosimeters, use of radiological work permits, and using step-off pads.

6. Verification that knowledge and practical abilities are maintained current is performed at least once every two years. This verification includes the following:

   - Written examinations on basic technical knowledge and the application of this knowledge; and

   - Demonstration of radiological protection practical abilities for those individuals required to enter radiologically controlled areas who have not used these abilities as a routine part of their work.

7. Training and examinations/demonstrations are completed prior to assigning personnel to tasks which require special knowledge and skills.

8. Personnel who do not complete continuing training and examination requirements satisfactorily within required time frames are not allowed to continue to work in radiologically controlled areas.

TC.5 MAINTENANCE PERSONNEL

PERFORMANCE OBJECTIVE

The maintenance personnel training qualification programs should develop and improve the knowledge and skills necessary to perform assigned job functions.

CRITERIA

*1. Programs are established and implemented for initial and continuing training.

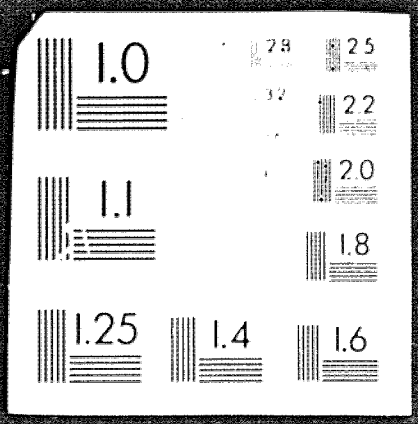
*2. On the job training requirements are identified, completed, and documented prior to assignment to perform the tasks independently.

*3. Qualification standards and evaluation methods are adequate to verify trainee competence.

4. Initial training includes classroom and on the job training, develops job-related knowledge and skills, and includes the following areas (unless selection criteria ensure that individuals already possess these knowledge and skills through previous training or experience):

- Maintenance fundamentals and troubleshooting and repair techniques;
- Facility systems and components;
- Special maintenance craft skills;
- Practical factor demonstration-work control procedures;
- Industrial safety;
- Radiological protection;
- Quality assurance and quality control;
- Maintenance procedures and practices, including surveillance procedures (if applicable);
- In-house and industry operating experience (including actual events); and
- Emergency response.

2 OF 3



5. Continuing training maintains and improves job-related knowledge and skills in areas such as the following:

   - Facility system and component changes-procedures changes;

   - Industry and in-house operating experiences (including actual events);

   - Seldom-used knowledge and skills that affect safe and reliable facility operation; and

   - Selected topics from #4. above to correct identified weaknesses.

TC.6 CRITICALITY SAFETY

PERFORMANCE OBJECTIVE

Personnel should receive training in nuclear criticality safety consistent with their assigned tasks.

CRITERIA

*1. All personnel working in the facility without escort are trained in criticality accident evacuation emergency procedures.

*2. Personnel handling fissile material are trained in criticality safety principles and control procedures appropriate to their assigned tasks.

3. Annual evacuation drills are conducted, documented, and critiqued. Criticality accidents are among the initiators used for these drills.

TC.7 TRAINING FACILITIES AND EQUIPMENT

PERFORMANCE OBJECTIVE

The training facilities, equipment, and materials should effectively support training activities.

CRITERIA

*1. Classroom facilities are adequate for effective group instruction.

*2. Reference materials are adequate and readily accessible.

3. Equipment is available, as needed, to support training material development.

4. Training aids are adequate to support hands on and practical demonstration training.

5. Training materials effectively support the training programs.

6. During laboratory or shop training, conditions of task performance, tools, and equipment reflect the actual job to the extent possible.

TC.8 QUALITY CONTROL INSPECTOR AND NONDESTRUCTIVE EXAMINATION TECHNICIAN

PERFORMANCE OBJECTIVE

The quality control (QC) inspector and nondestructive examination (NDE) technician training and qualification programs should develop and improve the knowledge and skills necessary to perform assigned job functions.

CRITERIA

*1. Programs are established and implemented for initial and continuing training.

2. Initial training develops necessary job related knowledge and skills, and includes the following areas:

   - Facility specific work control procedures;
   - Applicable codes, standards, and regulations;
   - Quality assurance and quality control fundamentals;
   - Inspection/examination equipment and procedures;
   - Job specific inspection/examination techniques;
   - Practical factor demonstration;
   - In-house and industry operating experience;
   - Radiological protection; and
   - Industrial safety.

3. On the job training requirements are identified, completed, and documented prior to assignment to the associated tasks.

4. Continuing training maintains and improves job-related knowledge and skills in areas such as the following:

   - Inspection/examination equipment, technique, and procedure changes;
   - Applicable code, standard, and regulation changes;
   - Industry and in house experience information;
   - Seldom used knowledge and skills that affect reliable facility operation; and

- Selected topics from #2. above to correct identified weaknesses.

5. Qualification standards and evaluation methods are adequate to verify trainee competence.

TC.9 RADIOLOGICAL PROTECTION PERSONNEL

PERFORMANCE OBJECTIVE

The radiological protection personnel training and qualification program should develop and improve the knowledge and skills necessary to perform assigned job functions.

CRITERIA

*1. Programs are established and implemented for initial and continuing training.

2. Initial training includes classroom and on the job training, develops job-related knowledge and skills, and includes the following areas (unless selection criteria ensure that individuals already possess these knowledge and skills through previous training or experience):

   - Fundamental mathematics and sciences;
   - Radiation protection theory, concepts, and procedures;
   - Radiation protection tools and equipment;
   - Emergency procedures and abnormal conditions;
   - Facility systems and components;
   - Facility operational fundamentals;
   - Facility design, operating, and procedures;
   - Biological effects and prenatal exposure;
   - Industrial safety and hazardous chemicals; and
   - ALARA principles.

3. Continuing training maintains and improves job-related knowledge and skills in areas such as the following:

   - Subject matter that is not reinforced by frequent direct use;
   - Radiation protection theory;
   - Operation of seldom used radiation protection equipment;
   - Applicable radiological incidents that have modified safety practices or procedures; and
   - Modification to radiation protection regulations, procedures and/or practices.

4. On the job training requirements are identified, completed, and documented prior to assignment to perform the tasks independently.

5. Personnel who are temporarily assigned to the facility are either directly supervised by a qualified technician, or complete the same training and qualification program as permanently assigned personnel.

TC.10 TRAINING FOR SUPERVISORS, MANAGERS AND TECHNICAL STAFF

PERFORMANCE OBJECTIVE

Training programs for supervisors, managers and the technical staff should broaden overall knowledge of facility processes and equipment and develop supervisory and management skills.

NOTE: This performance objective applies to those managers and supervisors to whom facility operations, maintenance, engineering, or technician personnel report. Technical personnel are those individuals whose job responsibilities affect the safe and reliable operation of the facility, but who are not operators, maintenance, or quality control inspectors and non-destructive examination technical personnel. Examples of such positions are: engineers, engineering technicians, test/surveillance personnel, and chemists/chemistry technicians.

CRITERIA

*1. Programs are established and implemented for initial and continuing training.

2. Training programs for supervisors, managers and technical personnel are effective in supplementing previous training and experience to prepare individuals for assigned responsibilities. Areas such as the following are included (if applicable to the job):

   - Job-related technical areas;
   - Supervisory/management skills and practices;
   - Purchasing and material storage;
   - Facility modification planning and implementation;
   - Budgeting and cost control;
   - Interfacing with external groups and organizations;
   - Site emergency preparedness; and
   - In-house and industry operating experience (including actual events).

3. Continuing training programs maintain job-related knowledge and skills, with emphasis on seldom used information and changes to the areas identified in #2. above.

TC.11 SIMULATOR TRAINING/FACILITY EXERCISES

PERFORMANCE OBJECTIVE

Simulator training and/or facility exercises should be conducted utilizing methods and techniques that are effective in developing and maintaining team and individual knowledge and skills in responding to abnormal and emergency events, and in integrated facility operations.

NOTE: The facility exercises referred to in this performance objective are not events that necessitate implementation of the site or facility emergency plan, but rather are abnormal or emergency situations to which the operations shift is expected to respond.

CRITERIA

*1. Simulator training and/or facility exercise programs are developed, documented, and implemented for initial and continuing training and competency demonstrations.

2. Clearly defined and measurable performance objectives are used in simulator training and/or facility exercise programs.

3. Simulator and/or facility exercises are effective in developing, reinforcing, and evaluating necessary job-related knowledge and skills in the following areas:

   - Application of theory to practical situations;
   - Predicting instrument response and use of instruments available;
   - Understanding alarm and annunciators and taking appropriate action;
   - Facility procedures and Technical Specifications / Operational Safety Requirements;
   - Application of good operating philosophies and practices;
   - Manipulate the controls in a safe and competent manner;
   - Diagnosing facility conditions during normal, off-normal, and emergency conditions; and
   - Communication and ability of the operating crew to work as a team.

4. The frequency of simulator/facility exercises and the practice time provided are adequate to maintain operating crew competency.

5. The attitude and actions of trainees, instructors, facilitators, and evaluators reflect a real-facility atmosphere to the extent practical.

6. Facilitator/instructor/trainee interactions during training exercises enhance the training process.

7. Training is enhanced by the use of pre-exercise briefs and post-exercise critiques.

8. Performance evaluations identify strengths and weaknesses of trainees/crews. Results are provided to appropriate managers in a timely manner.

9. Adequate preparation and precautions are used to ensure that safety is not compromised through the conduct of facility exercises.

AX. AUXILIARY SYSTEMS

1. SYSTEMS REQUIREMENTS
2. EFFLUENT HOLDUP AND TREATMENT
3. SOLID WASTES
4. STORAGE AND HANDLING OF FISSILE MATERIAL
5. VENTILATION SYSTEMS
6. VITAL SUPPLY SYSTEMS
7. HEAT REMOVAL SYSTEMS
8. ENGINEERED SAFETY SYSTEMS
9. COOLANT CLEANUP SYSTEMS

AX.1 SYSTEMS REQUIREMENTS

PERFORMANCE OBJECTIVE

Auxiliary systems shall be considered under the same functional criteria for design, engineering, operations, maintenance, and modifications as the structural, confinement, and primary process system of the facility.

CRITERIA

*1. Functional requirements of each auxiliary system are defined, documented, and maintained to meet safety and performance requirements as noted in the SAR and other facility reference design and safety assessment documents and Technical Specifications / Operational Safety Requirements.

2. Auxiliary systems should be operable under all normal operating conditions and under postulated accident condition environments if necessary.

3. Programmatic considerations for monitoring, surveillances, service, and age-related degradation of auxiliary systems are defined, documented, implemented, and reviewed on a periodic basis.

4. Auxiliary systems are part of the facility status control system.

5. Procedures and documentation for operations, modifications, and maintenance of facility auxiliary systems are maintained and controlled to appropriate standards of the quality assurance program.

AX.2 EFFLUENT HOLDUP AND TREATMENT

PERFORMANCE OBJECTIVE

Effluent holdup and treatment should ensure that the amount of hazardous substances released to the environment as escaping emissions and/or as effluent gaseous or liquid releases are less than DOE and EPA standards and are ALARA.

CRITERIA

*1. Instruments that measure radioactivity in all final effluent discharge paths operate properly, have sufficient sensitivity to make useful readings, and have been calibrated for the effluent being measured. Auditable records of readings are maintained.

*2. Monitoring systems provide adequate operating information, warning against malfunctions or unplanned releases including leaks, and can cause isolation of systems if releases exceed established limits.

*3. Goals, based upon past results and expected future operations, are established to reduce the total hazardous substances discharged to the environment.

*4. A periodic review of radioactive effluent records is performed to determine trends and to detect discharges exceeding established limits.

5. Facility activities are evaluated to minimize the generation of hazardous and radioactive liquid and gaseous wastes, and solid waste byproducts from nuclear processes. Liquid tank levels and waste gas decay tank pressures are monitored periodically to detect unexpected changes.

6. Radioactive liquid waste is recovered and reused to the maximum extent practicable. Waste streams are segregated during collection according to the treatment required for each waste stream.

7. Release of radioactive gaseous wastes is delayed as long as practicable to allow for maximum radioactive decay.

8. Methods are in use that promptly detect leaks. Action limits are used to control releases.

9. Waste system operators are knowledgeable of the waste systems and the operations they are required to perform.

10. Operating personnel understand the hazards of waste releases and the levels at which effluents can be safely released.

11. Operating procedures exist and are employed.

12. Operating limits are listed and records are maintained. Procedures effectively keep volume to a minimum.

13. Non-radioactive systems that have the potential to become contaminated are monitored by installed radiation detectors or are periodically sampled and analyzed.

14. Non-radioactive liquid discharges into radioactive waste systems are minimized.

15. Total curie content and volume of facility effluents are accurately determined and recorded; trends are determined and evaluated.

16. The program is routinely (at least annually) evaluated and necessary improvements are initiated.

17. All radioactive release pathways (liquid and gaseous), which have the potential to exceed the established limits, are monitored continuously.

18. All radioactive releases are evaluated against ALARA program objectives and to determine real population exposures.

AX.3 SOLID WASTES

PERFORMANCE OBJECTIVE

Solid hazardous wastes (including radioactive wastes) should be controlled to minimize the volume generated, and handled in a manner that provides safe storage and transportation.

CRITERIA

*1. Procedures for the handling, storage, and transportation of hazardous wastes exist and are followed.

*2. Personnel are trained in solid hazardous waste handling procedures and safety precautions, and in ALARA program objectives.

*3. Annual goals are established to reduce the amount of solid radioactive waste generated at the facility.

4. Procedures and training emphasize the importance of keeping the volume of solid hazardous waste to a minimum.

5. The practices for utilizing protective clothing contribute to minimizing solid radioactive waste.

6. Controls limit the materials that may be taken into areas where they may become radioactively or chemically contaminated.

7. Procedures for using, cleaning, and reusing protective clothing minimize the solid hazardous waste volume.

8. Management monitors operations which generate solid hazardous waste in order to reduce the volume generated.

9. Solid hazardous waste is stored in a manner which minimizes exposure, precludes deterioration of containers, and prevents the spread of contamination.

10. Personnel involved in transfer, packaging, and transportation of radioactive and other hazardous wastes are trained in the applicable regulations and procedures and in emergencies which might be encountered.

AX.4 STORAGE AND HANDLING OF FISSILE MATERIAL

PERFORMANCE OBJECTIVE

Fissile material should be stored and handled in a manner which minimizes the chances of loss, contamination, release, or inadvertent criticality.

CRITERIA

*1. Personnel handling fissile material are knowledgeable (as required by DOE 5480.5, Section 10 or DOE 5480.6, Section 8.e.) in:

- Use of fissile material handling, storage, shipping, and accountability procedures;
- Radiological safety and control practices;
- Use of safety and emergency equipment;
- Facility instrumentation pertaining to fissile material safety; and
- Emergency procedures.

*2. Unirradiated fissile material is stored in accordance with the requirements of DOE 5480.5, Section 13.

*3. The Technical Specifications/Operational Safety Requirements specify appropriate bounding conditions and tests to assure safe operation.

4. Fissile material is stored only in approved areas and/or facilities.

AX.5 VENTILATION SYSTEMS

PERFORMANCE OBJECTIVE

Ventilation systems should reliably direct all airborne effluents from contaminated zones or potentially contaminated zones through cleanup systems to ensure that the effluent reaching the environment is below the maximum permissible concentration and is ALARA.

CRITERIA

*1. Pressure drop measurements detect incipient clogging of filters and dehumidifiers and system failures.

*2. Charcoal filters are regularly tested in accordance with ANSI N510-1980.

*3. HEPA filters are regularly tested in accordance with ANSI N510-1980.

*4. Backup fans are available to provide ventilation in event of failure of primary fans.

*5. Exhaust monitoring equipment is selected, tested, and calibrated in accordance with the guidance found in ANSI N 13.1-1969 and N 13.10-1974.

*6. The Technical Specifications/Operational Safety Requirements specify appropriate bounding conditions and tests to assure safe operation.

*7. All tests and measurements required by Technical Specifications / Operational Safety Requirements are made in a timely manner in accordance with specified surveillance requirements.

8. Ventilation system flows are balanced so that air flow is from clean to less clean areas.

9. Ventilation filters and cleanup systems are maintained in good condition through regular checks, tests and preventive maintenance.

10. Air intake systems are maintained in good condition through regular checks, tests, and preventive maintenance.

11. Emergency procedures are provided to put facilities in safe condition and minimize leakage from contaminated zones if any ventilation system fails.

12. Where possible, highly contaminated zones have separate ventilation systems from less contaminated zones.

13. Emergency power sources with capability to function during a maximum credible accident are available, maintained and tested.

AX.6 VITAL SUPPLY SYSTEMS

PERFORMANCE OBJECTIVE

The electric, water, and emergency power systems should reliably provide vital services needed by the facility.

CRITERIA

*1. Emergency electric power systems are tested in accordance with IEEE 308-1980, Section 7, and its referenced standard IEEE 338-1977, Section 6 (for reactors). All additional tests and measurements required by Technical Specifications/Operational Safety Requirements are made in a timely manner and in accordance with specified surveillance requirements.

*2. The Technical Specifications/Operational Safety Requirements specify appropriate bounding conditions and tests to assure safe operations.

3. Personnel are trained in the configuration and operation of the utility systems and in emergency actions required in event of an outage.

4. Monitoring systems provide the operators with immediate warning of a system shutdown.

5. A preventive maintenance program / in-service inspection program ensures the reliability of valves, transformers, monitoring devices, etc., related to vital services.

6. A long-term surveillance program detects deterioration of inaccessible areas such as inside pipelines, pressure vessels, etc. This is part of the age-related degradation program at the facility.

7. Operators are skilled at bringing backup supply systems on line when primary sources fail.

8. The quality of the fuel supply for auxiliary power systems is verified on a regular basis.

AX.7 HEAT REMOVAL SYSTEMS

PERFORMANCE OBJECTIVE

The heat removal systems should reliably remove heat as required from the reactor or process and equipment important to safety.

CRITERIA

*1. Detailed procedures exist for the operation of a heat removal system under normal and abnormal conditions.

*2. Operators are trained in normal and emergency operations.

*3. Monitoring systems provide the operator with information on the condition of the heat removal system and warn of abnormal conditions.

*4. Effluent released by the heat removal system is at a level which is environmentally acceptable. Records of release levels are maintained.

*5. Procedures are available to minimize release of contamination in event of leakage of primary coolant into the secondary system.

6. Chemistry controls ensure optimum chemistry conditions during all phases of facility operation.

7. Laboratory and counting room activities provide accurate measuring and reporting of chemistry parameters.

8. Wet cooling towers have water treatment to minimize corrosion and reduce effluent. Records of treatment are maintained.

9. Monitoring of trends is sufficiently sensitive to detect fouling of heat exchangers.

10. Monitoring will detect any breakage of heat exchanger tubing which might release contamination into the secondary cooling system.

AX.8 ENGINEERED SAFETY SYSTEMS

PERFORMANCE OBJECTIVE

Engineered safety systems should be reliable and available to provide protection to the facility when required.

CRITERIA

*1. All tests and measurements required by Technical Specifications/Operational Safety Requirements are made in a timely manner and in accordance with specified surveillance requirements.

*2. Technical Specifications / Operational Safety Requirements and implementing procedures specify the appropriate minimum available engineered safety system components and monitoring devices which are necessary to allow continued operation. Actions to be taken in event these minimums are not met are identified in the Technical Specifications / Operational Safety Requirements and implemented by the procedures.

3. Procedures clearly define the checks and precautions necessary to guarantee availability of start-on-demand systems.

4. Start-on-demand systems are periodically checked for performance, and records of the results maintained.

5. Monitoring and tests are provided to give warning of pending failure of continuously operating systems.

6. A preventive maintenance / in-service inspection program for engineered safety systems exists and is functional.

AX.9 COOLANT CLEANUP SYSTEMS

PERFORMANCE OBJECTIVE

Recirculating coolants should be cleaned continuously or intermittently to minimize the buildup of contamination and reduce corrosion.

CRITERIA

*1. The Technical Specifications/Operational Safety Requirements specify appropriate bounding conditions and tests to assure safe operation.

*2. All tests and measurements required by Technical Specifications/ Operational Safety Requirements are made in a timely manner and in accordance with specified requirements.

*3. Procedures specify the conditions under which coolant cleanup must be in operation.

4. Checks and monitoring instrumentation detect incipient breakthrough of ion exchangers.

5. Chemicals added to coolant for control purposes are maintained within acceptable concentration limits while contaminants are being removed.

6. Laboratory and counting room activities provide accurate measuring and reporting of chemistry parameters.

7 Back-up cleanup systems exist, and procedures provide for how and when they are to be put in operation in event of failure of the main system.

EP. EMERGENCY PREPAREDNESS

1. ORGANIZATION AND ADMINISTRATION
2. EMERGENCY PLAN AND IMPLEMENTING PROCEDURES
3. EMERGENCY RESPONSE TRAINING
4. EMERGENCY PREPAREDNESS DRILLS AND EXERCISES
5. EMERGENCY FACILITIES, EQUIPMENT, AND RESOURCES
6. EMERGENCY ASSESSMENT AND NOTIFICATION
7. PERSONNEL PROTECTION

NOTE:

The facility will be expected to have an Emergency Drill while the TSA team is at the site. The drill should be planned in conjunction with the TSA team member. This drill could be planned in conjunction with the fire drill required (see Fire Protection).

EP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

Emergency preparedness organization and administration should ensure effective planning for, and implementation and control of, facility emergency response.

CRITERIA

*1. An emergency preparedness program is established in accordance with DOE 5500.3A.

*2. The emergency preparedness organizational structure, including interfaces with DOE site, Operations Office, and Headquarters emergency personnel, is clearly defined.

*3. Resources are allocated and assigned to accomplish assigned tasks for both routine and emergency duties.

*4. Responsibility is assigned to an individual for coordination of facility and site emergency response planning, and for maintaining the emergency management program documentation current, including the emergency plan and the emergency plan implementing procedures.

*5. The position which has overall responsibility and authority for the management of all operational emergencies is clearly defined and assigned at the senior management level.

*6. Individuals and alternates are designated to perform all emergency roles using clear lines of succession.

*7. Responsibilities and authority for each person in the emergency planning and emergency response organization are well defined and understood.

*8. Personnel clearly understand their authority, responsibilities, and relationships within the emergency organization and with support group interfaces.

*9. Emergency response organization personnel selection is based on assignments similar to normal day to day responsibilities and the individual's ability to properly analyze data, assess situations, and make decisions under high stress conditions.

*10. Technical support, operations, and maintenance personnel are identified.

*11. An independent annual review of the emergency management program and its documentation is conducted and documented.

*12. Timely and effective action is taken to track and correct identified emergency response deficiencies and their basic causes.

*13. Arrangements, agreements, and understandings with offsite groups are in place and documented.

*14. Provisions are in place for the management of the spectrum of operational emergencies for the facility/operation/activity, including emergencies involving both security and operational aspects and provisions for shifting from one type to another.

15. Facility management can retain effective command and control of the facility during the assessment, mitigation, and recovery phases of an accident.

EP.2 EMERGENCY PLAN AND IMPLEMENTING PROCEDURES

PERFORMANCE OBJECTIVE

The emergency plan, the emergency plan implementing procedures, and their supporting documentation should provide for effective response to operational emergencies.

CRITERIA

*1. The emergency plan is based on site-specific safety analyses of potential facility abnormal conditions such as those presented in the Safety Analysis Report, and covers the range of credible emergencies. Provisions are also in place to manage the aspects of severe accidents which involve unusual initiating events, multiple failures, or operator errors.

*2. The emergency plan keys to the area or site emergency plan and is developed in accordance with DOE 5500.3A.

*3. The emergency plan is concise, usable, and includes the following elements:

- Description of the emergency planning zone,
- Composition and responsibilities of the emergency organization,
- Emergency assessment,
- Emergency classification per DOE 5500.2A,
- Emergency action levels related to specific accident conditions,
- Notification process, using normal and alternate means of communication and including Headquarters Emergency Operations Center (EOC),
- Protective actions including onsite personnel protection, safe shutdown, and access control,
- Provision for issuing protective action recommendations for offsite personnel,
- Personnel evacuation and accountability,
- Access control over evacuated areas,
- Agreements with onsite and offsite emergency organizations, and
- Re-entry and recovery preplanning.

*4. Emergency plans are coordinated with Department, other Federal, State, and local emergency response groups.

*5. The detailed actions required to carry out the emergency plan are specified in implementing procedures. Such procedures are consistent with and, where appropriate, cross-referenced with the emergency plan, facility operating (normal and emergency) procedures, and other documents.

*6. The emergency plan and implementing procedures are updated or verified at least annually.

*7. Emergency response plans of supporting organizations are reviewed and updated at least annually.

*8. There is a distribution and control system which assures that all copies of the emergency plan and implementing procedures are kept current.

9. Feedback from evaluations, appraisals, and simulated drills and exercises (and actual events and emergencies in DOE and industry) is evaluated and utilized to improve emergency plan effectiveness.

EP.3 EMERGENCY RESPONSE TRAINING

PERFORMANCE OBJECTIVE

Emergency response training should develop and maintain the knowledge and skills for emergency personnel to respond to and control an emergency effectively.

CRITERIA

*1. Programs are established and implemented for initial and continuing training of emergency response personnel. These programs include training methods, evaluation standards, and implementation responsibilities.

*2. Initial emergency response training consists of classroom and hands-on (simulated drills and exercises), develops job-related knowledge and skills, and includes the following areas:

- Emergency plan and implementing procedures;
- Normal operating procedures used during emergencies;
- Abnormal and emergency operating procedures;
- Emergency facilities, equipment and systems;
- Communications and flow of information;
- Special precautions and limitations;
- Knowledge of public information and public interface issues; and
- Radiological and hazardous material properties.

*3. All members of the emergency response organization receive initial training before participation. Skills that must be demonstrated are identified, completed, and documented prior to assignment to perform the task independently.

*4. Continuing training maintains and improves emergency task-related knowledge and skills and includes items such as the following:

- Review of the items in #2, above;
- DOE, industry, and in-house emergency operating experience, as appropriate;
- Changes in emergency operating policies, plans, procedures, and facilities and equipment; and

- Weaknesses identified through conduct and review of the program, including drills and exercises.

*5. All members of the emergency response organization participate in continuing training on an annual basis.

*6. The knowledge and capabilities of all emergency response personnel are evaluated and recorded during initial training and during the annual continuing training.

*7. Training records are maintained for each individual in accordance with the requirements of the emergency response training program and DOE 1324.2, Records Disposition.

*8. The effectiveness of the emergency preparedness training program is periodically evaluated; the results are documented and used to make program improvements.

EP.4 EMERGENCY PREPAREDNESS DRILLS AND EXERCISES

PERFORMANCE OBJECTIVE

Emergency preparedness programs should include provisions for simulated emergency drills and exercises to develop and maintain the knowledge and skills for emergency personnel to respond to and control an emergency effectively.

NOTE: The drills and exercises referred to in this section are related to tests of and training on the emergency preparedness program. In many cases, these drills and exercises are best initiated using an operational situation. If accomplished that way, an additional benefit is gained by exercising the operations personnel and the interface between operations and emergency preparedness. Therefore, for maximum benefit, an operational drill or exercise can be used to lead into the emergency preparedness event, providing a drill or exercise to each program.

CRITERIA

*1. A program is established and implemented for the planning, scheduling, preparation, conduct, control, critique, and documentation of drills and exercises associated with emergency response per DOE 5500.3A.

*2. Emergency drills are held frequently for small organizational units (such as a shift emergency response team, a fire brigade, or a process building shift crew), to train personnel, and to perfect procedures and communications. The drills are of sufficient scope and frequency to ensure adequate response capability in all areas applicable to the facility/operation/activity.

*3. Emergency drills include simulated events to test response to such events as medical emergencies, radiological and hazardous material monitoring (spills, airborne releases, sampling, etc), fires, loss of vital equipment, facility evacuation and accountability, and security emergencies.

*4. Communication drills are held at least quarterly to test the primary and backup emergency communications, including those with onsite and offsite support groups and the Headquarters Emergency Operations Center (EOC).

*5. All communications during drills and exercises include statements to clearly identify that the event is simulated.

*6. Emergency exercises are conducted periodically to test the interactions of the entire emergency response organization or major organizational units, and to perfect the operation and coordination of the overall emergency management program.

*7. Drills and exercises are conducted to a master plan such that over a period of time, all the procedures, personnel, facilities, and onsite and offsite groups are involved and tested per the criteria of DOE 5500.3A, and DOE 5500.9, Readiness Assurance for Operational Emergencies.

*8. Realistic scenarios are prepared for all drills and exercises, with detail and control measures commensurate with the scope and complexity of the event and the number of players involved.

*9. Assignments are made for drill and exercise controllers. They are appropriately trained and prepared to ensure control of the simulated event while providing information to the players in a realistic fashion without prompting.

*10. Trained evaluators are assigned to monitor and document performance of the players (and controllers) to ensure maximum benefit is derived from the drill or exercise.

*11. Drill and exercise simulation is minimized. Wherever possible, the indications from and the response to the simulated event are the same as if the event were real.

*12. Every drill and exercise is formally critiqued with all players, controllers, and evaluators and the results are documented. A system of deficiency identification, evaluation, analysis, and follow-up is established to ensure weaknesses and deficiencies are corrected, thereby strengthening the emergency management program.

EP.5 EMERGENCY FACILITIES, EQUIPMENT, AND RESOURCES

PERFORMANCE OBJECTIVE

Emergency facilities, equipment, and resources should adequately support facility emergency operations.

CRITERIA

*1. Both normal (control rooms) and emergency facilities, including an Emergency Operations Center, of adequate size and appropriate location are designated, equipped, and maintained ready to support emergency response per DOE 5500.3A, Attachment III.

*2. Control rooms for operations and utilities, which are the primary control stations for facilities during emergencies, are considered in the planning for emergency facilities.

*3. Adequate backup or alternate facilities are available as required by the emergency plan and supporting documents.

*4. Sufficient reliable primary and backup communications networks are available to accommodate normal operations and emergency needs.

*5. Alarms are adequate to notify all personnel of emergencies. Reliable plant announcing systems ensure full coverage of the facility.

*6. Emergency equipment is inventoried, tested, and serviced on a periodic basis per DOE 5500.3A, Attachment III, to ensure accountability and reliability. Inventories and tests are documented (and posted where applicable). Included is equipment for:

- Supporting the performance of timely accident assessment;
- Emergency dosimetry;
- Monitoring personnel, the facility, and facility environs for all hazardous substances (radiological and non-radiological) present at the facility;
- Emergency meteorological evaluations and forecasts;
- Emergency power and water supplies;
- Transporting personnel;
- Handling radioactively or chemically contaminated personnel; and
- First aid, health, and safety.

*7. Current copies of emergency preparedness documentation are readily available to the emergency response organization. Examples are emergency plans and implementing procedures; photographs of layouts and facilities; engineering material such as as-built drawings, procedures, and vendor manuals; forms and checklists; lists of properties and amounts of radiological and non-radiological hazardous materials; and Safety Analysis Reports.

*8. Instrumentation is provided to monitor the condition of processes, plant systems, experiments, vital cooling systems (for reactors and experiments), and engineered safety features during the entire course of an accident. Where normal monitoring stations (such as control rooms) may be evacuated, instrumentation for monitoring key parameters from emergency facilities is provided.

EP.6 EMERGENCY ASSESSMENT AND NOTIFICATION

PERFORMANCE OBJECTIVE

Emergency assessment and notification procedures should enable the emergency response organization to correctly classify emergencies, assess the consequences, notify emergency response personnel, and recommend appropriate actions.

CRITERIA

*1. A system of Emergency Action Level criteria is established to aid in properly classifying events.

*2. Classification of emergency events is consistent with current DOE requirements as stated in DOE 5500.2A.

*3. Systems are established for coordination of event classifications with local and State emergency response agencies and for coordination of releases of accident-related information to the public.

*4. Notification systems and procedures minimize distraction of operating personnel and include, as appropriate, the use of preformatted messages. Notification is conducted in a timely manner.

*5. Notifications include the emergency response organization, local and Headquarters DOE elements, and state and local emergency response agencies, as appropriate.

*6. Procedures for assessing a release of hazardous material (both radiological and non-radiological) include methods for measuring levels in facilities, onsite, and offsite, and for determining the magnitude of the source term and projected dose for potential releases.

*7. Information on the nature and magnitude of the hazards are made available to appropriate emergency personnel.

*8. Protective action guides are available and used by appropriate emergency response personnel.

*9. Records and logs are kept to enable review and reconstruction of actions taken during an emergency event.

EP.7 PERSONNEL PROTECTION

PERFORMANCE OBJECTIVE

Personnel protection procedures should control and minimize personnel exposure to hazards during abnormalities, ensure that exposures are accurately determined and recorded, and ensure proper medical support.

CRITERIA

*1. Individual exposure limits (radiation and chemical) conforming to DOE 5480.1A, Chapter XI, 4.a., and DOE 5480.10, are established for emergencies such as saving a life or protecting vital equipment. Procedures designate who can authorize the use of these limits.

*2. Sufficient quantities of calibrated instruments are available to measure expected exposure rates (radiological and non-radiological).

*3. Where potential hazards include radioactive iodine from processes or accidents, procedures and training are provided for the determination of radioiodine concentration in contaminated areas, and a policy is established for the use of thyroid-blocking agents.

*4. Prearranged plans and agreements provide for transportation and medical treatment of injured and contaminated personnel.

*5. First aid and decontamination supplies, procedures, and facilities are readily available.

*6. Emergency limits are established for decontamination of personnel, equipment, and facilities.

*7. Sufficient respiratory equipment and supplies are available. A backup method for recharging air bottles is available. The responsibility for maintaining and repairing respiratory equipment is established.

*8. Provisions and procedures are in place for facility, area, and site evacuation.

*9. Evacuation routes are clearly marked and kept free of obstacles.

*10. An effective system for personnel accountability is in place.

11. Arrangements are in place for providing and processing appropriate dosimetry devices for the emergency condition.

TS. TECHNICAL SUPPORT

1. ORGANIZATION AND ADMINISTRATION
2. PROCEDURES AND DOCUMENTS
3. FACILITY MODIFICATIONS
4. EQUIPMENT PERFORMANCE TESTING AND MONITORING
5. ENVIRONMENTAL IMPACT
6. PACKAGING AND TRANSPORTATION OF HAZARDOUS MATERIALS
7. REACTOR ENGINEERING
8. CRITICALITY SAFETY

TS.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

The administration of technical support functions should ensure effective implementation and control of technical support activities.

CRITERIA

*1. Technical support supervisory personnel are knowledgeable concerning facility operations and have sufficient expertise regarding facility systems and components to effectively investigate and resolve facility problems.

2. The organizational structure and responsibilities are well defined with technical, administrative, and professional expertise properly distributed throughout the organization.

3. Staffing and resources are allocated and established to accomplish assigned tasks.

4. Responsibilities and authority for each management, supervisory, and professional position are well defined through written job or position descriptions.

5. Personnel clearly understand their authority, responsibilities, accountabilities, and interfaces with other groups.

6. Administrative controls are employed for activities that affect safe and reliable facility operation. Examples of such activities include design changes and modifications to the facility and/or processes, additions and modifications to computer software, installation of permanent and temporary modifications, and conduct of equipment performance monitoring.

7. Performance appraisals are effectively used to enhance individual performance.

8. Technical support personnel are actively encouraged to develop improved methods of meeting safety, quality, and productivity goals.

9. The quality assurance program addresses technical support work activities involving: procurement of equipment; shipping, handling, identification storage, and control of purchased items; and storage and control of materials and supplies that fall within the purview of the approved QA program.

TS.2 PROCEDURES AND DOCUMENTS

PERFORMANCE OBJECTIVE

Technical support procedures and documents should provide appropriate direction, allow for adequate record generation and maintenance for important activities, and should be properly and effectively used to support safe operation of the facility.

CRITERIA

*1. Approved Technical Specifications / Operational Safety Requirements are in place, as required by DOE 5480.5/5480.6

*2. A complete and current Safety Analysis Report for the facility is available for reference by the technical support groups.

*3. The Technical Specifications / Operational Safety Requirements are consistent with the current facility configuration, operations, and Safety Analysis Report.

*4. The written bases in the Technical Specifications / Operational Safety Requirements clearly identify the safety implications of exceeding specified limits or controls. The Technical Specifications / Operational Safety Requirements contain not only the Limiting Conditions for Operations (LCOs), but also clearly specify the actions to be taken if the LCOs are not met, as well as the Surveillance Requirements.

*5. Procedures are clear, concise, and contain adequate information for users to understand and perform their activities effectively:

- Portions or steps of other documents that are used or referred to when performing a procedure are clearly identified in the procedure, and

- Procedures include other human factor considerations (such as sequenced procedure steps and use and placement of notes and caution statements) to promote error-free performance.

*6. Procedures correctly reference any Technical Specification / Operational Safety Requirement implemented by the performance of stated activities.

*7. A formal policy or procedure governing the use of procedures is implemented. It includes the following:

- Action to be taken when procedures are found to be inadequate for the intended tasks or when unexpected results occur;

- Directions for when procedures are to be used as general guidance, are to be followed step-by-step, or require sign off for specific or all steps;

- Identification of procedures required to be in-hand when performing the activities to which they pertain; and

- Action to be taken if procedures conflict or do not contain adequate guidance or would violate a Technical Specification / Operational Safety Requirement.

8. The preparation, review, approval, and revision of procedures and documents are properly controlled and performed in a timely manner. Copies of the latest version are distributed promptly to all affected users.

9. Up-to-date versions of procedures, manuals, and reference materials such as technical documents, drawings, and data sheets, are readily available, clearly identified, and technically accurate.

10. Procedures are approved and validated prior to use.

11. Temporary changes to procedures, if used, are controlled to ensure the following:

    - Entry into log book when temporary procedure is used;

    - Appropriate review and authorization prior to use;

    - Implication of changes to Technical Specifications / Operational Safety Requirements, if applicable;

    - User awareness of applicable temporary changes;

    - Timely cancellation or incorporation into permanent procedures; and

    - Proper notification of operations management of use of temporary procedures.

12. Procedures and documents require that adequate records are maintained on a timely basis for support services performed at the facility.

TS.3 FACILITY MODIFICATIONS

PERFORMANCE OBJECTIVE

Technical support services required by the facility to execute modifications should be carried out in accordance with sound engineering principles that should assure proper design, review, control, implementation, and documentation in a timely manner.

CRITERIA

*1. Appropriate technical specialities (such as criticality safety, machine shop, design engineering, process or reactor engineering, speciality testing, packaging and transportation of hazardous materials, and instrument and electrical specialties) are available and effective.

*2. Codes and standards, including those mandated by DOE Order 5480.4, Attachment 2, are addressed in designing facility modifications.

*3. Approved procedures and qualified personnel are used to design, review, control, implement, and document permanent and temporary facility modifications.

*4. Design changes undergo a formal, technical, interdisciplinary review and approval. The bases for these reviews are clearly documented. Formal guidance is provided delineating the requirements for performing and documenting technical reviews and as required by DOE 5480.5 and 5480.6.

*5. A defined system exists for conducting operational readiness reviews prior to startup after any modification that involves an unreviewed safety question as required by DOE 5480.5 and 5480.6.

*6. Changes to facility process and alarm setpoints and computer software are controlled in a manner similar to other facility modifications.

*7. Design changes and facility modifications are included in the evaluations for the Safety Analysis Report, Technical Specifications / Operational Safety Requirements, and applicable procedures.

8. Activities related to modifications, including design, procurement, installation, testing, and closeout, are effectively coordinated among responsible groups.

9. All modification requests are reviewed by facility management for inclusion in the modification program and training program. Approved requests are identified, prioritized, scheduled and tracked. Facility management monitors the modification schedule and takes appropriate action to ensure schedule adherence.

10. Design changes receive an effective review for ALARA, constructability,

testability, operability and maintainability, with input from appropriate facility personnel. These would include personnel from operations, maintenance, radiation control, etc.

11. Requirements for installing, verifying installation, inspecting, testing modifications for operability, and declaring modified components or systems operable, are specified as part of the design process.

12. Technical support work required at the facility, such as installing and testing modifications, is coordinated with and controlled by facility personnel.

13. Modification testing is completed prior to placing modified systems in service. All operability requirements must be met prior to declaring the system operable.

14. Design, installation, and testing records are reviewed for completeness and accuracy prior to final acceptance of the modification.

15. Documents, such as drawings and procedures, affected by facility modifications, are updated prior to operation of the system or equipment.

16. Facility personnel are cognizant of the effect of modification and thoroughly trained prior to operating and maintaining modified systems and equipment.

17. Temporary modifications are allowed only as necessary to permit continued operation of the facility. Temporary modifications are controlled in the same manner as permanent modifications. As a minimum, the program should include the following:

    - Technical and safety reviews, and necessary training and documentation updates, are performed prior to declaring modified systems and equipment operable; and

    - Temporary modifications are periodically reviewed for continued need. Those needed on a permanent basis are converted to permanent modifications by going through the permanent modification process from the beginning.

18. Final documents (as-built drawings, procedures, etc.) are completed and issued in a timely manner to support close-out and the declaration of system operability.

19. The as-built configuration of modified systems is verified by comparisons with approved design criteria and design documents prior to operational acceptance by the facility staff. In addition, design, testing, and installation records are reviewed for completeness and accuracy prior to final acceptance of the modification.

20. Field changes receive a technical review and approval equivalent to the original design change.

21. The effectiveness of the modifications control program is periodically evaluated, and the results are used to make program improvements.

22. Personnel training is completed prior to facility operation with design changes and facility modifications.

TS.4 EQUIPMENT PERFORMANCE TESTING AND MONITORING

PERFORMANCE OBJECTIVE

Effective equipment performance testing and monitoring should be performed by technical support groups to assure that equipment and system performance is within established safety parameters and limits.

CRITERIA

*1. Approved procedures and qualified personnel are used to conduct performance monitoring functions.

*2. Performance data are analyzed; and, the results are used to optimize facility reliability, efficiency, and safety and to check for age-related degradation indications.

*3. Technical support groups perform all tests required by Technical Specifications / Operational Safety Requirements that are within their scope of responsibility.

*4. Information on potentially significant safety-related deficiencies is reported to management on a timely basis in accordance with DOE 5000.3 and 5484.1.

5. Programs are implemented to routinely monitor, collect, trend, and analyze performance data (including thermal, hydraulic, electrical, materials, chemistry, and mechanical data) for equipment and systems important to facility operation and safety.

6. These programs provide data of sufficient quantity and quality so that personnel can address detection, investigation, and resolution of age-related degradation issues within the facility.

7. Instrumentation used for performance monitoring is periodically calibrated and has adequate sensitivity and accuracy to provide reliable results.

8. Optimum performance levels are defined through design basis documents and requirements, initial baseline data, actual operating performance, and/or modeling. These levels are continually reviewed for adjustments when facility modifications are implemented or when age-related degradation is detected.

9. Sufficient policies, procedures, and data documents are available so that the performance testing and monitoring program and activities are auditable by a third party.

10. Malfunctions, degradations, or other deficiencies observed in equipment and systems important to safety are reported promptly to the Safety Review Committee.

11. The effectiveness of performance monitoring programs is periodically evaluated and the results used to make program improvements.

TS.5 ENVIRONMENTAL IMPACT

PERFORMANCE OBJECTIVE

The impact on the environs from the operation of the facility should be minimized.

CRITERIA

*1. Facility management has taken all reasonable efforts to minimize quantities of radioactive and hazardous materials released to the environment from facility operations.

2. All points of potential release of radioactive and hazardous material to the environment from the facility are monitored sufficiently to provide assurance that the quantities and qualities of the releases are known.

3. Responsibilities for independent monitoring of the environs of the facility are well defined and understood.

4. Resources are provided as required to accomplish independent monitoring.

5. Facility management assures that appropriate independent monitoring is being conducted.

6. Auditable records are kept which show the radioactive and hazardous material release quantities and qualities.

7. Instrumentation is periodically calibrated and has proper accuracy and range.

TS.6 PACKAGING AND TRANSPORTATION OF HAZARDOUS MATERIALS

PERFORMANCE OBJECTIVE

Performance of the packaging and transportation (P&T) functions should assure conformance with existing standards and accepted practices as given in DOE 5480.3, and other DOE and Federal regulations.

CRITERIA

*1. Management directives are current, and contain appropriate standards and references including:

- Requirements for record keeping, DOE 1324.2;
- Policies and procedures for traffic management, DOE 1540.1;
- Management procedures for the generation, transportation, storage, and disposal of hazardous waste, DOE 5480.2; and
- Requirements for the packaging and transportation of hazardous materials, substances and wastes, DOE 5480.3.

*2. Operating procedures are documented and reflect conformance with applicable standards in at least the following areas:

- Transport: Monitoring, documenting loading and unloading of vehicles; sending and receiving packages; on-site movements on public roads; issuance of Certificates of Compliance for all radioactive material shipped from the facility;
- Storage: Areas properly maintained and clearly marked; combined storage areas meet 49 CFR 177; fuel tanks maintained and diked; supply and waste lines labeled, and in proper condition;
- Records: Requirements meet DOE 1324.2; radioactive materials packaging and shipments meet DOE 5480.3;
- Vehicle maintenance (on-site): Repair, modification, inspection, and test performed adequately and documented; areas well maintained; tools and equipment clean and segregated; safety equipment specified and available; formal PM program in place;
- Hazardous waste storage: Radioactive and non-radioactive segregation; proper containers and ALARA considerations; labeling; and
- Fissile materials packaging: Personnel handling; auditable records; labeling and shipping documents; receiving materials.

*3. Personnel are properly trained to the requirements of DOE 5480.3 (which includes the requirements of 49 CFR 100-199 and 10 CFR 71). Training is provided, but not limited to , packaging personnel, truck drivers, fork lift operators, emergency response personnel (police, fire), and their respective supervisors.

*4. Accident reporting procedures are complete, documented, and meet the requirements of DOE 5000.3 and DOE 5484.1.

5. The organization and administration clearly depicts lines of responsibility and communications, and provides for strong management support for adherence to policies, procedures, and safety.

6. Clear policy statements are in place regarding:

   - Standards for the design and fabrication of on-site packaging;

   - P&T safety for non-radioactive hazardous materials as well as for radioactive materials; and

   - Safety oversight of P&T functions and operations.

7. Organizational and communication relationships with other facility functions, e.g. health physics, police, security, and fire departments, are well defined for normal and emergency operations.

8. Staffing is adequate in number and expertise.

9. In response to operational requirements and regulatory changes, plans for future safety requirements include P&T.

10. Response to DOE Operations Office appraisals has been positive and timely.

11. Internal audits are timely, independent and auditable.

12. Quality assurance activities include the design, procurement (requisitioning and receipt), use, and maintenance of packaging as required by existing requirements.

TS.7 REACTOR ENGINEERING

PERFORMANCE OBJECTIVE
(Reactors only)

Reactor engineering activities should ensure optimum nuclear reactor operation without compromising design, safety, or nuclear fuel limits.

CRITERIA

*1. Approved procedures and qualified personnel are used to perform reactor engineering duties.

*2. Important parameters affecting core performance, core power monitoring, and reactivity control are routinely trended to detect deviations from normal.

*3. Fuel management and control programs are implemented to ensure safe core loading and operation.

4. Fuel integrity is maintained by observing operating limits and specifications as those contained in the Technical Specifications.

5. Parameters indicating fuel integrity are routinely analyzed to detect possible fuel failures. Methods for responding to fuel failures are clearly defined, including coordination between affected groups.

6. Approved backup analytical techniques for important computer functions are provided in procedures, and appropriate personnel are knowledgeable in their use.

7. Fuel control and accountability programs are implemented to maintain complete, accurate, and current fuel history.

TS.8 CRITICALITY SAFETY

PERFORMANCE OBJECTIVE
(Reactors only)

Specialized support for criticality safety issues should be fully integrated into the operation of the reactor, and the handling and storage of fuel by facility personnel.

CRITERIA

*1. Criticality monitoring systems are in place, functioning, properly calibrated, and tested.

*2. Criticality alarm systems conform to the requirements of ANSI/ANS 8.3-1979.

*3. The alarm system is clearly audible in all areas which must be evacuated.

*4. Facility management administers a nuclear criticality safety program to ensure nuclear criticality issues are considered during all relevant activities in accordance with DOE 5480.5 and DOE 5480.6.

5. Nuclear criticality safety is achieved by controlling one or more specified parameters of the system within subcritical limits.

6. Approved operating procedures address criticality safety limits in providing effective guidance for safe operations.

7. Facility personnel are trained in nuclear criticality safety principals and requirements in a manner consistent with their assigned tasks.

8. Evacuation routes are designated and identified.

(NOTE: Use only for reactor evaluations. For other nuclear facilities, use Section CS.)

SS. SECURITY/SAFETY INTERFACE

1. SAFETY OF IMPROVEMENTS
2. EMERGENCY ACCESS AND EGRESS
3. FACILITY PLANNING FOR SECURITY/SAFEGUARDS EMERGENCIES
4. SAFETY OF SECURITY ACTIVITIES

SS.1 SAFETY OF IMPROVEMENTS

PERFORMANCE OBJECTIVE

Security/safeguards improvements and modifications should not create or increase hazards that would impede the safe, reliable operation or shutdown of the facility in normal, abnormal, or emergency situations.

CRITERIA

*1. Designs for new facilities or modifications to existing facilities for security/safeguards receive the same reviews, approvals, controls, testing, and documentation and are designed to the same codes, standards, and criteria as other facility improvements, additions, and modifications.

2. Normal facility modifications and modifications made specifically for security/safeguards improvements are all reviewed by both safety (for life safety code) and security before construction is commenced.

3. Changes to facility modifications during construction are not commenced until reviewed and approved using safety and security standards at least as good as the original design.

4. A mechanism for resolving relative importance of comments between the various review groups, such as safety, facility operations, and security, is established and results in suitable treatment of safety, health, and security concerns.

5. Reviews by safety and security representatives of facility designs and modifications are documented and retained as part of the record (including conclusions and considerations of alternative solutions).

SS.2 EMERGENCY ACCESS AND EGRESS

PERFORMANCE OBJECTIVE

Authorized facility and safety support personnel should not be denied access in an emergency. Egress during emergencies should be conducted according to approved preplanning.

CRITERIA

*1. Access to the site/facility is preplanned and prearranged for emergency personnel and equipment (such as fire department, rescue, and medical) during emergencies.

*2. Control of access to the site, the facility, and the scene during emergency situations and events is provided by the security forces. Such control is documented in the Security Plan and coordinated with the Emergency Plan.

*3. Consideration is given for the effects of loss of site and emergency power supplies to access and egress from the site, facilities, and the various security compartments. Appropriate safety and security measures for these situations are documented in the Security Plan and/or Emergency Plan

4. Access during emergencies by operations and emergency personnel to security compartments within facilities is preplanned and prearranged. Where appropriate, key facility operations and safety support personnel are provided special identification and priority access to security compartments vital to operational safety and emergency response.

5. Egress from the site, facility, and scene of emergencies is unimpeded or conducted according to approved preplanning. If used, holding areas, fences, and other security barriers which restrict evacuation paths and times are evaluated to ensure that they do not create undue risks to evacuating personnel from exposure to direct radiation or released radioactive and/or hazardous materials.

SS.3 FACILITY PLANNING FOR SECURITY/SAFEGUARDS EMERGENCIES

PERFORMANCE OBJECTIVE

Safety authorities and responsibilities for all types of security/safeguards emergencies should be well defined and understood by all involved parties.

CRITERIA

*1. Responsibilities of facility operations personnel during safeguards/security emergencies at the facility are defined. In each class of emergency, responsibilities of security and facility personnel are not redundant, and interfaces of the various parties are explicitly defined.

*2. Analyses are performed of the potential consequences associated with using weapons, vehicles, and other protective force equipment in the vicinity of safeguarded systems or components, and hazardous materials and processes. These analyses are in accordance with DOE 5480.16, and include how the consequences are to be mitigated by design, Emergency Plan, Security Plans, and other administrative measures. These analyses receive input from safety, security, emergency preparedness, and facility operations for a proper balance of concerns, needs, and preplanning.

*3. The facility drill and exercise programs in emergency preparedness and/or operations include security involvement in simulated operational emergencies. Separate security drills which affect operations are conducted with required frequency.

*4. Documented critiques are conducted after each drill and exercise with participation from players, controllers, and evaluators.

5. Changes in responsibility that take effect when a security incident evolves into an operations emergency (and vice versa) at the facility are explicitly defined.

6. The preplanning effort includes clearly defined interfaces between DOE security, contractor security, facility operations, and other affected parties.

7. Investigations are conducted and documented for all reported cases of tampering, vandalism, and destruction (or attempted destruction) of property, parts, and equipment.

SS.4 SAFETY OF SECURITY ACTIVITIES

PERFORMANCE OBJECTIVE

Safety aspects of security activities involving use of weapons and other protective force equipment in the vicinity of safety systems and/or hazardous processes and materials should be identified and understood by all involved parties.

CRITERIA

*1. Personnel protective provisions are made for the security forces during emergencies, such as releases of radioactive and/or hazardous materials, and for the period of time that control boundaries are undergoing change during evacuation. Protective equipment is provided, and security force training is conducted on the use of the equipment and procedures.

*2. Training for all security personnel includes that required by the facility general employee/personnel protection training including emergency response. These basics are supplemented by specific training for security participation in emergency response for both operational and security emergencies.

*3. Security forces receive appropriate training in the chemical and radiological hazards, and in other specific safety rules for the features of the facilities with which they interact.

*4. In all security force training, safety is a prime consideration. This includes the basics of weapons and protective force equipment safety, and the considerations for the interaction with facility personnel and the public per DOE 5480.16.

5. The results of analyses performed for the use of weapons and other protective force equipment in and around the facilities are factored into security force training and the Security Plans.

6. During drills and exercises, whether for security forces and/or facility operations, safety is the first priority. Safety considerations are included in briefings, in the procedures for the drill and exercise conduct, and are obvious by demonstration during drill and exercise preparation and performance.

EA. EXPERIMENTAL ACTIVITIES

1. INTERFACE WITH EXPERIMENTERS
2. EXPERIMENT CATEGORIES
3. EXPERIMENT PROPOSALS
4. OPERATION OF EXPERIMENTS

EA.1 INTERFACE WITH EXPERIMENTERS

PERFORMANCE OBJECTIVE

Persons planning or conducting experiments in or with the facility should have their relationship to the operating group clearly defined.

CRITERIA

*1. Procedures and written instructions are developed jointly by the operations personnel and the R&D staff that clearly define their respective responsibilities for operations affecting the safety of operating personnel and the public during conduct of the experiment at all stages (i.e., design, fabrication, installation, operation, modifications, and removal).

2. Research and development (R&D) groups who make use of the facility are properly staffed with qualified experimenters who are familiar with facility operations.

3. The operations supervisor receives a list of the R&D staff members, their responsibilities for the experiment, and how they can be notified if unusual conditions develop or begin to develop during an experiment when the experimenters are absent.

4. The operators communicate with the R&D staff concerning the experimental or operational parameters which may affect the expected progression of the experiment. The operations supervisor is kept informed and is the person who directs any change in operations or any emergency action which should be taken.

5. Facility operations personnel periodically observe ongoing experimental activities to confirm adherence to facility and experimental procedures.

EA.2 EXPERIMENT CATEGORIES

PERFORMANCE OBJECTIVE

All proposed experiments are to approved by an independent Safety Review Committee before they are performed.

CRITERIA

*1. A review procedure exists to determine an envelope of acceptable parameters for routine or repetitive experiments for use by facility management. Technical Specifications / Operational Safety Requirements are prepared for use with such experiments that meet this envelope of acceptable parameters.

*2. Experiments involving unreviewed safety questions or which may exceed a Technical Specification / Operational Safety Requirement are always reviewed by the Safety Review Committee (SRC) and submitted by contractor management to DOE for authorization in accordance with DOE 5480.1B, 5480.5, and 5480.6, only after the "approval authority" is prepared to approve the experiment.

3. A procedure exists for determining the extent of review needed for experiments.

4. Routine or repetitive experiments are generally approved by facility management.

5. Non-routine experiments and those having safety significance are reviewed by the SRC whose members are independent of the experimental program, and approval is recommended to the appropriate "approval authority" after the committee is satisfied.

6. Any safety problems which develop after SRC approval are themselves reviewed independently.

EA.3 EXPERIMENT PROPOSALS

PERFORMANCE OBJECTIVE

Sufficient information on a proposed experiment should be submitted to permit a safety evaluation to be made.

CRITERIA

*1. An information and evaluation package containing design and operating details and an analysis of the safety implications of the experiment is submitted to the facility manager with the experimental proposal.

*2. The final experiment proposal on which the Safety Review Committee (SRC) recommends approval includes complete engineering quality assurance, operating details and procedures including any assistance required from the operating group, and appropriate Technical Specifications / Operational Safety Requirements associated with the proposed experiment.

*3. The interaction of the experimental conditions and facility operations are reviewed and approved by facility management as well as the SRC.

4. Personnel proposing an experiment have adequate background and training.

5. Large experiments are reviewed at many stages, so that the output from safety reviews can be incorporated into the design as it progresses.

6. The independent SRC may provide experimenters with a proposal outline to ensure that information is submitted on applicable areas pertaining to safety.

7. Any precaution or design change recommended by the SRC and accepted by the "approval authority" is incorporated in the final design and experiment operating procedure.

8. All desired changes to experimental conditions which could in any way adversely impact any experimental limitation are reviewed and approved by the same process as the original experimental limitations.

EA.4 OPERATION OF EXPERIMENTS

PERFORMANCE OBJECTIVE

Experiments performed in reactors or process facilities or experiments performed with a reactor should not present undue risk or significantly increase the risk previously evaluated for the reactor or process facility.

CRITERIA

*1. Conditions adverse to safety or health are promptly corrected and measures taken to preclude repetition. These conditions are reported in accordance with DOE 5484.1 (or DOE 5000.3 as appropriate).

2. The responsibilities for experiment safety are well understood, having been agreed to before the experiment, and documented as part of the experimental procedure.

3. Installation and/or operation of the experiment is accomplished utilizing the approved design and procedures. When changes are required, they are also approved before the experiment is installed and/or operated.

4. Limitations imposed on experiments are understood, documented in the procedures, and observed by the experimenters and the facility operators.

5. Facility operators continually monitor the experiment during operation to ensure that no adverse effects on the facility develop.

6. Any hazards or unusual occurrences which develop from the experiment are immediately reported to facility management and the Safety Review Committee.

7. Facility management is cognizant of important developments involving experiments as they occur, and investigates promptly.

8. Changes to procedures for conducting experiments are subjected to the same formal review process as the original procedures, are distributed in a timely manner to all personnel needing them, and a mechanism is in place to ensure they are read and understood.

9. Experiments are conducted in accordance with approved procedures, which include actions to be taken in the event of abnormal conditions.

10. Vital experimental conditions are monitored and recorded to provide assurance that unsafe conditions do not develop (and have not existed).

FR. FACILITY SAFETY REVIEW

1. SAFETY REVIEW COMMITTEE
2. SAFETY REVIEW TOPICS
3. OPERATION OF SAFETY REVIEW COMMITTEE
4. ANNUAL FACILITY SAFETY REVIEW
5. TRIENNIAL APPRAISAL OF FACILITY SAFETY REVIEW SYSTEM
6. OPERATING EXPERIENCE REVIEW

FR.1 SAFETY REVIEW COMMITTEE

PERFORMANCE OBJECTIVE

A Safety Review Committee should be available to review safety questions and the safety impacts of experiments. This committee is part of the "Contractor Independent Review and Appraisal System" specified in DOE 5480.6, and DOE 5482.1B. Section 9.d.

CRITERIA

*1. The Safety Review Committee (SRC):

- Is appointed by management;
- Functions in an advisory capacity to management;
- Has a written charter which specifies its responsibility, authority, composition, quorum, documentation of efforts, and reporting requirements;
- Keeps records of its actions in sufficient detail to permit auditing;
- Is composed of members having the capability for multi-disciplinary reviews with in depth technical competence in areas reviewed;
- Treats safety considerations in sufficient breadth and depth to provide reasonable assurance that all potential consequence in areas being reviewed;
- Provides for group discussion on all but more routine matters; and
- Provides an independent determination of whether a proposed experimental activity involves an unreviewed safety question or other matters.

2. Management ensures that suitable technical people are made available to the SRC as requested to provide specialty services as needed for safety review.

3. The SRC is responsible to assure that an independent safety review has been made of all experiments including designs, operational parameters conduct of experiments, and expected impact on the site.

FR.2 SAFETY REVIEW TOPICS

PERFORMANCE OBJECTIVE

Items that require review by the Safety Review Committee should be well defined and understood by facility management.

CRITERIA

The Safety Review Committee is involved with reviewing:

*1. Incidents and accidents involving significant safety problems and selected Unusual Occurrence Reports (UORs).

*2. All facility, process, equipment or instrumentation modifications, and any other changes to safety related systems or components.

*3. Changes to, and violations of, Technical Specifications/Operational Safety Requirements.

*4. Proposed experimental programs.

*5. Any other problem that facility or contractor management feels may have safety significance.

6. The quality assurance activities related to designs, design changes, fabrication, installation, and checkout of equipment and instrumentation.

7. All accident analyses performed of facility activities or systems.

8. The effects of facility aging.

9. All facility restart plans/operational safety reviews.

FR.3 OPERATION OF SAFETY REVIEW COMMITTEE

PERFORMANCE OBJECTIVE

Review of facility activities by the Safety Review Committee should ensure achievement of a high degree of safety.

CRITERIA

*1. The quality of each review is evident from the documentation of the scope and content of the review. Documentation of each review includes identification of significant safety questions that were considered, and the basis for judging why each was considered to be either acceptable or unacceptable.

2. The facility manager promptly reports to the Safety Review Committee (SRC) any topic which may be of concern.

3. After review, recommendations of the SRC are submitted to top contractor management.

4. Recommendations of the SRC are approved or disapproved by top management, and those approved are sent to the facility manager for implementation.

5. The reasons for management rejection of any SRC recommendation are documented.

6. All but the most routine matters are dealt with through group discussions with participation by appropriate disciplines.

FR.4 ANNUAL FACILITY SAFETY REVIEW

PERFORMANCE OBJECTIVE

An annual operating review of the facility should be performed by a committee appointed by top contractor management.

CRITERIA

*1. Areas covered by the annual review include:

- Modifications made to facilities and equipment having safety significance and safety analyses thereof;
- Proposed experiments and irradiations having safety significance;
- Procedures and significant changes thereto;
- Performance of training programs;
- Adherence to nuclear criticality safety program requirements;
- Occurrences; all Unusual Occurrence Reports (UORs);
- The condition of the physical facilities;
- Organization and staffing;
- Accuracy and completeness of records and documentation; and
- Vital operational and maintenance activities.

2. Top contractor management documents the assignment of personnel for the annual review.

3. The individuals performing the annual review are not the same as those who review safety questions.

4. The annual review must be documented so that an adequate third party review can be conducted.

5. Review methods and emphasis are varied from year to year to avoid continually looking at the same topics in the same way.

6. Outside consultants are periodically added to the annual review to provide different perspectives.

FR.5 TRIENNIAL APPRAISAL OF FACILITY SAFETY REVIEW SYSTEM

PERFORMANCE OBJECTIVE

A triennial appraisal of the safety review system should be performed by contractor management.

CRITERIA

*1. The frequency between appraisals is consistently less than 42 months.

2. A reviewer or a committee is appointed by management to conduct triennial appraisals.

3. Records and documentation pertaining to the safety review of the facility during the past 3 years indicate that all necessary safety issues have been addressed appropriately by the review system.

4. Interviews with facility personnel indicate that the Safety Review Committee and the safety review system are effective and respected.

5. Documentation of the triennial appraisal is adequate for a third party review of the quality of content.

6. Methods used for the conduct of triennial appraisals provide an independent assessment of the effectiveness of the safety review system.

7. Appraisals address the adequacy and performance of the management systems established for independent safety review.

FR.6 OPERATING EXPERIENCE REVIEW

PERFORMANCE OBJECTIVE

Operating experiences should be evaluated, and appropriate actions should be undertaken to improve safety and reliability.

CRITERIA

*1. An effective follow-up system assures that appropriate and timely actions are taken to achieve improvements.

*2. Technical support analysts are knowledgeable concerning the facility and its operation.

3. In-house events are screened for significance and prioritized for evaluation.

4. Rigorous investigation is performed on significant in-house events to determine root causes, generic implications, and necessary corrective actions to prevent recurrence.

5. Comprehensive reviews of system protective actions (e.g., scrams, high pressure/temperature shutdowns) include:

   - Identification and resolution of the causes(s) of the protective action;

   - Identification and resolution of discrepancies between actual and expected system responses; and

   - Documentation to support results and recommendations.

6. In-house events are trended to identify recurring problems and determine appropriate corrective actions.

7. A comprehensive evaluation is performed on applicable, significant industry operating experience, and appropriate corrective action is completed in a timely manner. Sources of significant operating experience information that are reviewed for applicability include:

   - DOE and NRC letters, bulletins, and information notices;

   - Supplier and architect/engineer reports;

   - Facility event reports; and

   - INPO operating experience information/documents.

8. Pertinent in-house operating experience information is distributed to

appropriate personnel and departments in a timely manner.

9. An age-related degradation program is in place at the facility and includes review and assessment of records from maintenance (preventive and corrective maintenance history), operations (system and component performance testing) and technical support (design basis requirements).

CS. NUCLEAR CRITICALITY SAFETY

1. ORGANIZATION AND ADMINISTRATION
2. USE OF NUCLEAR CRITICALITY SAFETY CONTROL PARAMETERS
3. NUCLEAR CRITICALITY SAFETY EVALUATIONS
4. OPERATING PROCEDURES AND CRITICALITY SAFETY LIMITS
5. CRITICALITY ALARM SYSTEM AND EMERGENCY PROCEDURES

CS.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

All operations with fissionable material should be conducted to provide effective nuclear criticality control during all activities.

CRITERIA

*1. The program meets the requirements of DOE 5480.5 and ANSI/ANS 8.1-1983.

*2. The nuclear criticality safety program is defined and documented.

*3. There exists a nuclear criticality safety function that is independent of operational responsibilities.

*4. The nuclear criticality safety program includes a formal internal review and audit of conformance of operations to the program.

*5. A system for the control and traceability of required records is documented.

CS.2 USE OF NUCLEAR CRITICALITY SAFETY CONTROL PARAMETERS

PERFORMANCE OBJECTIVE

Nuclear criticality safety should be achieved by controlling one or more specified parameters of the system within subcritical limits.

CRITERIA

*1. Where practicable, criticality control will be physically built into the process equipment.

*2. Any administrative control necessary to maintain subcriticality is specified by:

- Mass and concentration controls to maintain nuclear criticality safety, and
- When physical conditions do not assure a safe volume, controls to prevent double batching.

*3. Process limits are based on experimental data or on results of validated calculational techniques.

*4. Process design incorporate sufficient margins of subcriticality to require at least two unlikely, independent, and concurrent changes in process conditions before criticality is possible.

*5. For processes that rely on neutron absorbers, such as boron or cadmium, for control of criticality, the effectiveness and continued presence of the absorber is verified. Use of soluble absorbers receives particular care.

CS.3 NUCLEAR CRITICALITY SAFETY EVALUATIONS

PERFORMANCE OBJECTIVE

Nuclear criticality safety evaluations of the design and operation of process equipment should assure that subcriticality is maintained under normal and credible abnormal operating conditions.

CRITERIA

*1. Before starting a new operation with fissionable material, or before modifying an existing operation, a nuclear criticality safety evaluation demonstrates that the entire process will be subcritical under both normal and credible abnormal conditions. The adequacy of the nuclear criticality safety evaluation is independently confirmed.

*2. The parameters that are controlled to assure subcriticality are explicitly identified and their associated limits given.

*3. The nuclear criticality safety evaluations are documented with sufficient detail and clarity to allow independent review of the results.

*4. The effect of neutron moderation and reflection are considered in the systems involving fissionable material.

*5. Criticality safety evaluations include appropriate allowance for experimental and computational uncertainties.

*6. The nuclear criticality safety review and evaluations are performed by persons independent of operational responsibilities.

CS.4 OPERATING PROCEDURES AND CRITICALITY SAFETY LIMITS

PERFORMANCE OBJECTIVE

The approved written operating procedures should address criticality safety limits in providing effective guidance for all aspects of facility activities.

CRITERIA

*1. Operations to which nuclear criticality is pertinent are governed by written procedures that include limits and controls to assure the safety of the operation:

- Limits and controls are prominently identified as notes or cautions, and
- When criticality safety limits are changed, procedures are changed to reflect these changes prior to any further operation.

*2. Nuclear criticality safety limits are posted at work locations to assist personnel in maintaining constant awareness of the limits.

*3. Nuclear criticality safety limits are posted in conspicuous places near fissionable material storage areas.

*4. New or revised procedures impacting nuclear criticality safety are reviewed by the criticality safety staff.

*5. Procedures require the reporting and investigation of occurrences involving violations of criticality safety limits in conformance with DOE 5484.1 and DOE 5000.3.

CS.5 CRITICALITY ALARM SYSTEM AND EMERGENCY PROCEDURES

PERFORMANCE OBJECTIVE

All reasonable steps should be taken to mitigate the consequences of a nuclear criticality accident.

CRITERIA

*1. Nuclear criticality alarm systems are provided in areas where significant quantities of fissionable material are handled, processed or stored in conformance with DOE 5480.5.

*2. Criticality alarm systems conform to the requirements of DOE 5480.5 (see also ANSI/ANS 8.3-1986):

- The alarm system is clearly audible in all areas which must be evacuated;
- The detectors are capable of detecting a criticality condition that produces an absorbed dose in free air of 20 rads of combined neutron plus gamma radiation at an unshielded distance of 2 meters from the fissionable material within 60 seconds;
- Provisions are made to minimize false alarms. These provisions may include concurrent response of two or more detectors or single, highly reliable detectors to initiate the alarm. In redundant systems, failure of a single channel shall be in a fail-safe mode;
- Instrument response is tested and calibrated on a defined schedule. Records of the tests and calibrations are maintained; and
- The entire alarm system is tested on a defined schedule. Each audible signal generator is tested at least once every 3 months.

*3. Fixed and personnel nuclear accident dosimeters are supplied in areas requiring criticality alarm systems in conformance with DOE 5480.1 Chapter XI.

*4. Emergency procedures, exercises, and drills are provided.

5. Evacuation routes are designed and identified.

6. Radiation monitoring instruments and procedures are provided for determining the radiation in the evacuated area following a criticality accident.

RP. RADIOLOGICAL PROTECTION

1. ORGANIZATION AND ADMINISTRATION
2. INTERNAL AUDITS AND INVESTIGATIONS
3. RADIOLOGICAL PROTECTION PROCEDURES AND POSTING
4. EXTERNAL RADIATION EXPOSURE CONTROL PROGRAM
5. EXTERNAL RADIATION DOSIMETRY
6. INTERNAL RADIATION EXPOSURE CONTROL PROGRAM
7. INTERNAL RADIATION DOSIMETRY
8. FIXED AND PORTABLE INSTRUMENTATION
9. AIR MONITORING
10. RADIATION MONITORING/CONTAMINATION CONTROL
11. ALARA PROGRAM
12. RECORDS

RP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

Facility/site organization and administration should ensure effective implementation and control of radiological protection activities on the facility/site.

CRITERIA

*1. Inspections and audits utilizing DOE 5482.1B, Section 10, are scheduled and performed by contractor safety personnel independent of the operation to determine the effectiveness of the radiological protection program to identify problems and to initiate necessary corrective actions.

2. Organizational responsibilities for radiological protection are well defined and understood.

3. Staffing and resources are sufficient to accomplish assigned tasks.

4. Appropriate responsibilities are assigned to site management personnel for such matters as:

   - Minimizing personnel radiation exposure;
   - Minimizing the contamination of areas, equipment, and personnel; and
   - Reducing solid radioactive waste volumes.

5. Responsibilities and authorities for each radiological protection technician position on the facility/site are clearly defined and sufficient to control work activities to protect employees.

6. Personnel clearly understand their authority, responsibilities, accountabilities, and interfaces with supporting groups.

7. Radiological protection requirements are actively administered by facility/site management and supervision and adhered to by personnel.

8. The radiation protection manager has direct access to the operations managers and has sufficient authority to perform his duties effectively.

9. Managers and supervisors observe radiological protection activities to ensure adherence to established policies and procedures and to identify and correct problems.

10. Auditable reports of inspections, audits, and resulting corrective actions taken, are maintained.

11. Procedures approved by facility/site management are in place to implement the radiological protection program and are updated periodically.

12. Radiological protection problems are documented and evaluated. These evaluations are reviewed for trends, and actions are taken to correct the causes.

13. Facility/site managers are aware of trends with regard to occupational radiation exposures, quantity and quality of solid and liquid radioactive waste, contamination and radiation levels and the number and location of radiation and contaminated areas within the facility/site.

14. Radiological protection personnel are actively encouraged to develop improved methods of meeting radiation protection objectives and goals.

15. Indicators of radiological protection performance are established and periodically assessed to enhance radiological protection effectiveness.

RP. 2 INTERNAL AUDITS AND INVESTIGATIONS

PERFORMANCE OBJECTIVE

The internal audit program for both routine operations and unusual radiological occurrences should provide adequate performance assessments.

CRITERIA

INTERNAL AUDITS

*1. The internal audit program complies with DOE 5482.1B, Section 9.d and DOE 5480.1B, Chapter XI.

2. All radiation protection program elements are audited (i.e., procedures, records, routine survey program, internal and external dosimetry, instrumentation, calibration, etc.).

3. The internal audit is conducted by individuals knowledgeable in radiation protection but independent of the program being audited.

4. Internal audits are conducted on a specified frequency, at least every 3 years.

5. Internal audits are documented.

6. Management is aware of findings and recommendations from the internal audit and assures appropriate followup action.

ACCIDENTS/INCIDENTS

*1. Unusual Occurrence Reporting and Accident Investigation and Reporting is consistent with DOE 5000.3 and DOE 5484.1.

2. Procedures for investigation and documentation of accidents and incidents are documented.

3. Investigations of incidents and accidents consider such factors as:

   - The frequency of such losses to control and
   - Operations or workers that are "frequent repeaters" of such incidents.

4. A review is performed to determine and correct the cause of even minor incidents. Upper management shows support of efforts to eliminate even "minor" incidents.

5. Management response to prevention and/or correction of incidents is positive. There is adequate followup, including additional training of workers, to keep all employees informed of the types of incidents that are occurring to enhance their safety consciousness or awareness.

6. Accidents are investigated thoroughly and documented and publicized appropriately. Closeout procedures are in place.

7. Management will stop work if necessary to ensure that any corrective action is taken to preclude repetition of an accident.

8. Corrective action includes consideration of engineering design changes, if warranted, to preclude repetition of an accident.

9. Adequate pre-job planning is performed to reduce or minimize the potential for an accident.

10. Training of workers is documented for the high-risk jobs to promote a safety awareness attitude.

RP.3 RADIOLOGICAL PROTECTION PROCEDURES AND POSTING

PERFORMANCE OBJECTIVE

Radiation protection procedures for the control and use of radioactive materials and radiation generation devices should provide for safe operations and for clearly identified areas of potential consequences.

CRITERIA

PROCEDURES

*1. The radiation protection documentation system has a hierarchically arranged system that allows the tracing of DOE Order requirements from:

- The Orders to policy,
- Policy to contractor standards and controls, and
- Contractor standards and controls to procedures.

*2. The contractor has a written policy on radiation protection (including ALARA).

*3. Radiation protection standards, procedures, and controls have recognizable or formal technical bases for limits, methods, and personnel protection standards. They include sound radiological requirements such as those recommended in American National Standards Institute (ANSI) and National Council on Radiation Protection and Measurements (NCRP) documents.

4. Radiation work procedures (permits) are used for all radiation area work. These procedures are approved by health physics staff and contain adequate provisions for:

- Protective apparel,
- Work limitations,
- Job descriptions,
- Radiological conditions, and
- Special instructions.

5. Radiation protection procedures are adequately documented and updated periodically. This includes, but is not limited to:

- Facility/site posting,
- Developing and maintaining all radiation protection records,
- Reporting unusual radiation occurrences,
- Operating radiation-generating equipment,

- Using radiation monitoring instruments,
- Using radiation sources (e.g., reference and calibration),
- Tracking personnel medical evaluation,
- Reporting radiation exposures,
- Using protective clothing,
- Responding to radiological emergency events,
- Surveying and monitoring,
- Providing counting room equipment and procedures, and
- Utilizing instrument maintenance and control.

6. Procedures, standards and controls programs have a documented approval system. Those who generate and those who use the program both concur in the procedures.

7. The procedures, standards and controls program elements have specific intervals for review and/or revision. There is a tracking scheme to ensure that the required reviews and revisions occur.

8. The procedures, standards and controls program elements are maintained in a centralized historical file. There is a designated period of time that such files must be maintained.

POSTING

*1. The technical criteria, and dose rate and/or levels, for defining radiation, high radiation, very high radiation, contamination, and airborne radioactivity areas are established, documented, and consistently applied.

*2. Radiation levels are established and documented for when areas are to be barricaded and marked to prevent inadvertent entry, and when areas are to be physically locked to preclude unauthorized entry.

*3. DOE required forms are posted in all facilities on the site.

*4. Entrance to areas where radioactive materials are used or stored is restricted based upon established criteria.

5. Current radiation work permits (radiation zone entry permits) meeting the requirements of the facility/site are posted at entrances to work areas. They reflect actual working conditions. Out-of-date work permits are removed in a timely manner.

6. Results of radiation surveys of radiation areas are posted at the entrance.

7. Airborne activity areas are posted to alert personnel to possible respiratory protection requirements.

8. Only trained, authorized personnel handle radioactive materials.

9. Areas where radioactive materials are handled or stored are clearly and accurately posted.

SOURCE CONTROL

*1. Inventories of stored radioactive materials specify locations, quantities, and characteristics, and are current and periodically audited.

*2. Procedures are in place to adequately control, label, handle, ship, and receive source material. They do address ALARA principles.

*3. Leak checks are performed on all sources including calibration sources in accordance with ANSI N54.2.

4. Natural, depleted, or enriched uranium and natural thorium is stored and processed separately from highly toxic alpha emitters.

5. Containers used for storage provide at least one barrier for containment, more if warranted.

6. An inventory is maintained of source material, which is audited by management.

RADIATION-GENERATING DEVICES

*1. ANSI N43.2 and N54.3 are utilized, as appropriate, in establishing radiological safety programs for radiation-generating devices.

*2. Fail-safe interlocks are used, tested, and documented on radiation-generating devices, and barriers are adequately used to ensure the safety of operators and other personnel.

*3. Set-points to activate interlocks or other safety systems (i.e., beam shutters, warning lights, etc.) associated with radiation-generating devices are defined.

4. The radiation field around radiation-generating devices and radioactive material has been well characterized (type, energy, and dose range known).

5. Operating procedures, interlock procedures, and warning signs are posted at radiation-generating machine operating consoles and in target areas.

6. A sufficient number of warning lights are installed so that at least one light is visible from occupied areas adjacent to the X-ray machine and from all avenues of approach to such area.

7. The shielding design limit for X-ray machines -- the dose rates allowed in areas adjacent to ALARA dose rates areas -- are defined.

8. Appropriate area radiation monitoring systems are used for radiation-generating devices.

9. Remote and local readout provided for radiation-generating devices have visible and audible alarm capacity.

10. Specialized inspections and surveys of X-ray machines are performed periodically and documented.

RP.4 EXTERNAL RADIATION EXPOSURE CONTROL PROGRAM

PERFORMANCE OBJECTIVE

External radiation exposure controls should minimize personnel radiation exposure.

CRITERIA

*1. Effective exposure control methods are in use, which include:

- Determining the boundaries of radiation and high radiation areas, and posting entry requirements based on accurate and timely radiation level information. The boundaries of these areas are clearly identified and posted (see RP.3 POSTING);

- Clearly posting "Hot spots";

- Using radiation work permits or similar controls to control exposures associated with specific jobs (see RP.3 PROCEDURES);

- Controlling personnel exposures in work areas involving high exposure rates by a combination of special tools, shielding, timekeeping, and monitoring of accumulated exposure;

- Routing personnel traffic through lower exposure rate areas, and establishing waiting, staging, and office areas in low background areas; and

- Using controls to protect personnel from transient high radiation levels such as those involved in moving radioactive materials.

*2. Exposure trends are monitored and actual exposures are compared to established ALARA goals (see RP.11). Actions are initiated to correct a problem or adjust the goals as appropriate.

3. Proper controls are used to minimize exposure to the skin and eyes, e.g., by use of protective clothing and equipment.

4. The radiation exposure reduction program includes the following:

- Planning for the work,

- Work scheduling that provides for completion of exposure reduction efforts prior to and during work and ensures the order of work provides the lowest exposures,

- Basing job goals upon estimates made using facility and industry experience, and

- Determining job goals that are realistic but stringent enough to encourage improvements.

5. Specific job-related exposure reduction efforts are incorporated into work procedures, including the following, where appropriate:

   - Using temporary or permanent shielding,
   - Using special tools,
   - Flushing and decontamination, as appropriate,
   - Pre-operational and post-operational briefings of personnel,
   - Specialized training and "dry runs" on mock-up equipment,
   - Utilizing auxiliary lighting and a working environment with comfortable temperature and humidity and adequate space, where feasible,
   - Providing adequate communication capabilities, and
   - Assigning to the job site only the minimum number of personnel needed to perform the work.

6. Analysis of current practices and comparison with industry-wide exposure controls are ongoing actions to achieve minimum exposures.

NOTE: Portions of RP.3 "RADIOLOGICAL PROTECTION PROCEDURES AND POSTING", RP.8 "FIXED AND PORTABLE INSTRUMENTATION", RP.10 "RADIATION MONITORING/CONTAMINATION CONTROL", and RP.11 "ALARA PROGRAM" may apply to this section on external exposure control.

RP.5 EXTERNAL RADIATION DOSIMETRY

PERFORMANCE OBJECTIVE

The routine and accident personnel radiation dosimetry programs should ensure that personnel radiation exposures are accurately determined and recorded.

CRITERIA

ROUTINE DOSIMETRY

*1. The program appropriately incorporates the requirements of ANSI Standards 13.5-1972, N319-1976, N323-1978, and Department of Energy Laboratory Accreditation Program (DOELAP) Standard for personnel dosimetry systems.

*2. The contractor participated or plans to participate in DOELAP to test its dosimeter.

*3. Actions have been taken to correct deficiencies identified by participation in DOELAP.

*4. Visitors to radiation areas are monitored to determine any exposures. Exposures are reported in accordance with DOE 5484.1.

5. Dosimeter (whole body and extremity) calibration facilities and procedures are adequate to cover the range of exposures, energies, and type of radiation anticipated.

6. Technical criteria and dose rate levels for assignment of extremity and personnel dosimeters are established and documented.

7. Procedures to identify workers for whom monitoring is required and the frequency with which their dosimeters are processed are available and are technically based.

8. Personnel who enter radiologically controlled areas wear appropriate dosimetry devices capable of accurately measuring whole-body and/or extremity exposures from the types of radiation present.

9. Whole-body exposures dosimeters are worn in the proper location and manner to measure the highest whole-body exposure.

10. Extremity dosimetry devices are worn when performing work where extremity exposures are likely to be significantly higher than whole-body exposures.

11. Personnel exposure histories are readily available to those who are responsible for exposure control (e.g., radiation protection and operational supervisors).

12. Adequate field surveys of work locations are performed and documented to determine when routine and special dosimetry are needed.

13. Personnel decontamination equipment, supplies, and procedures are properly stored and routinely inventoried.

14. A quality control program is implemented and documented to evaluate dosimetry program performance which includes intercomparison studies and laboratory validation procedures.

15. Correction factors or other appropriate methods are employed to ensure exposures from the types of radiation present and high- and low-energy gammas are accurately recorded in Rem.

16. Dosimeter operations are performed by and results interpreted by qualified personnel.

17. Records of personnel exposures and methods of determining exposures at the site are permanently maintained and retrievable.

18. The amount of error (error range) in the dose measurements from personnel and extremity dosimeters are documented.

19. The minimum detection levels of personnel and extremity dosimeters for gamma, beta, and neutron radiation for the primary sources of radiation that exists on the site are documented.

20. If appropriate, skin dose is measured and procedures for doing so documented.

21. A procedure for estimating the dose from a lost dosimeter is available.

NUCLEAR ACCIDENT DOSIMETRY

*1. Nuclear accident dosimetry meets the requirements of ANSI N13.3.

2. Performance of the personnel nuclear accident dosimeter has been documented and verified by participation in an intercomparison program, e.g., Oak Ridge National Laboratory.

3. Personnel dosimeters worn in radiation areas are adequate to cover the range of exposures and energies anticipated from an accident.

4. If neutron dosimetry is not used, there is documented supporting evidence to justify the use of neutron to gamma ratios to determine neutron exposure.

5. Procedures, models, and methods are in place to characterize the source terms involved in accidents.

6. In the event of an accident, backup dosimetry or instrumentation systems exist for the determination of personnel dose.

RP.6 INTERNAL RADIATION EXPOSURE CONTROL PROGRAM

PERFORMANCE OBJECTIVE

Internal radiation exposure controls should minimize internal exposures.

CRITERIA

*1. A respiratory protection program complying with ANSI Z 88.2 defines responsibilities and requirements in the following areas:

- Training,
- Control and use of respirators,
- Mask and fit testing, and
- Breathing air purity.

2. Engineered controls are used to prevent the intake of radioactive material, including the following, when feasible:

- Portable filtration systems are used to control airborne contaminants,

- Containment structures, such as tents, are used to protect personnel working in adjacent areas, and

- Unique fittings are used for the plant breathing air system.

3. Accurate and timely airborne radioactivity survey information is available for determining the boundaries of airborne radioactivity areas, posting entry requirements, and minimizing internal exposure to workers during work activities. The boundaries of these areas are clearly identified and posted.

4. Accurate and timely contamination survey information is available for determining the boundaries of airborne radioactivity areas, posting entry requirements, and minimizing internal exposure to workers during work activities. The boundaries of these areas are clearly identified and posted.

5. Radiation work permits or similar controls are used to control personnel entry into areas where airborne radioactivity exists or where radioactive material may become airborne due to work being performed.

6. The number of areas where respiratory equipment is required is minimized.

7. Monitoring data are used to perform trend analysis. Appropriate corrective action is taken whenever there are significant numbers of positive in-vivo counts observed or when air concentrations are elevated, even though the observed levels are less than regulatory limits.

8. Eating, drinking, smoking, and chewing are not permitted in contaminated or potentially contaminated areas.

9. Procedures and resources are available to perform dose calculations when significant internal exposures occur.

Note: Portions of RP.3, "RADIOLOGICAL PROTECTION PROCEDURES AND POSTING"; RP-7, "INTERNAL RADIATION DOSIMETRY"; RP.9, "AIR MONITORING"; RP.10, "RADIATION MONITORING/CONTAMINATION CONTROL," and RP.11, "ALARA PROGRAM", may apply to this section on internal exposure control.

RP.7 INTERNAL RADIATION DOSIMETRY

PERFORMANCE OBJECTIVE

The internal radiation dosimetry program should ensure that personnel radiation exposures are accurately determined and recorded.

CRITERIA

*1. The technical criteria employed to determine which employees are included in the bioassay program, and the frequency of bioassay are documented and are consistent with ANSI N343, ANSI N13.30 (draft), and ALARA practices.

*2. A quality control program, including the use of internal audit samples, is employed by the contractor.

*3. The frequency and timeliness of in vitro and/or in vivo bioassay and notification of field personnel of results is appropriate for the radionuclides present and the nature of the operations.

*4. Procedures to identify workers for whom bioassay is required and the frequency is technically based.

5. The types of routine monitoring of workers (in vivo and/or in vitro) are appropriate for the radionuclides present.

6. Personnel who perform work in radiologically controlled areas where a potential for airborne radioactivity exists are monitored for internal deposition of radioactivity as follows:

   - At least annually;
   - Prior to performing radioactive work, after initial employment, and upon termination of employment;
   - Whenever it is suspected that personnel breathed high airborne radioactivity;
   - Periodically for those workers who have the highest potential for breathing high airborne radioactivity; and
   - Following personnel contaminations, unless exempted by the radiological protection manager or his designee.

7. Procedures for the internal radiation dosimetry program are documented and updated periodically.

8. Trigger points to instigate an investigation of an intake or supposed intake are established and technically based.

9. A radiation dose to organs is computed following an intake. If doses are calculated for some intakes but not for others, a technical basis for deciding which intakes require dose calculations is established.

10. Procedures are employed to present cross contamination of (indirect) bioassay samples.

11. Particle size and solubility of airborne contaminants to which a worker has or may have been exposed are determined.

12. The contractor has a documented policy on work restrictions as a result of internal radiation exposure (i.e., to permit dose assessment and/or for temporary or permanent work restrictions).

13. Procedures are established and documented to identify individuals who fail to leave routine in vitro bioassay samples.

14. Procedures for in vitro and/or in vivo bioassay of visitors, if appropriate, to radiation areas are established and documented.

15. The minimum detection level for in vitro and/or in vivo bioassay procedures are documented.

16. In vivo counting equipment is calibrated and maintained on an established frequency.

RP.8 FIXED AND PORTABLE INSTRUMENTATION

PERFORMANCE CRITERIA

Personnel dosimetry and radiological protection instrumentation used to obtain measurements of radioactivity should be calibrated, used, and maintained so that results are accurately determined.

CRITERIA

*1. Instrumentation (normal and emergency) and instrumentation calibration are consistent with ANSI N42.17, ANSI N323, ANSI N320, ANSI N317, ANSI N43.1, and ANSI 13.10, as appropriate.

*2. Instrument calibrations are traceable to a recognized standard (NIST).

3. Instrumentation selection is based on objective criteria (such as performance standards, site requirements, etc.). Selected instruments are acceptance tested against those criteria to ensure that they are satisfactory, and the results are documented.

4. Instruments are properly tested and calibrated periodically, and adequate records of servicing and calibration are maintained by the facility/site.

5. Technically based criteria are used to determine the frequency of calibration and tests for operation.

6. The complement (number and types) of instruments are adequate to meet the needs of both the routine and non-routine radiation protection surveillance program and are appropriate for the activities and radiation sources present.

7. Instruments have current calibration stickers with appropriate correction factors, and an adequate system for instrument recall has been established.

8. The facility/site has adequate arrangements for decontamination of operative and inoperative instruments.

9. The calibration facility (onsite or vendor) has well-characterized dose rate profiles of the full range and type of sources needed to calibrate instruments for the situations encountered in the facility or on the site, and is periodically quality-control checked.

10. The instrument repair facility has adequately trained personnel and facilities to service the instruments in use in a prompt and safe manner.

11. Methods have been established to periodically test overload response, temperature sensitivity, linearity, and stability.

12. If special conditions exist, such as radio frequency fields, magnetic fields, etc., that would require special instruments, these instruments have been tested to ensure a lack of susceptibility to these factors.

13. An adequate supply of instruments that will operate up to 100 R/h is available.

14. Adequate check sources are available and used for both emergency and routine instruments to ensure they operate properly prior to use.

15. "Extendable" detectors are available for remote monitoring under accident conditions.

16. The calibration facility can calibrate the high ranges and tests for overload response and is done periodically.

17. Procedures are available for workers to determine if instruments, such as hand and shoe counters, are operating.

18. The numbers and locations of fixed instruments are adequate to assess accident conditions. (They would not be affected by elevated background radiation and the readout will be accessible during a serious emergency.)

19. Fixed instruments alarm at a central location in addition to the alarm at the instrument location.

20. The exact locations of fixed instruments are documented (height above floor, etc.) so that the shielding effect can be calculated from drawings and the exposure rate in nearby locations estimated in the event of a serious accident (i.e., a criticality accident).

RP.9 AIR MONITORING

PERFORMANCE OBJECTIVE

Air monitoring systems through selection, location, calibration, and maintenance should ensure reliable estimates of air activity for radiological control purposes.

CRITERIA

*1. Action levels, investigation levels, and maximum permissible concentrations (MPC) used are based on appropriate technical criteria to evaluate air sampling and monitoring results and determine necessary control procedures.

*2. The minimum detection limits (MDL) or minimum detectable activities (MDA) for the specific radionuclides of interest are provided. The detection levels provide optimum worker protection and are appropriate for established action levels, investigation levels and MPCs are documented.

*3. Routine air monitor calibrations include minimum detectable activity; energy dependence; efficiency; precision; response time; stability, alarm threshold accuracy and stability; air flow accuracy and stability; air in-leakage; and effects of temperature, humidity, and ambient pressure.

4. A documented, acceptable air sampling and monitoring program is in place, and is supported by sufficient studies (e.g., air flow patterns, particle size distribution).

5. Air sampling and monitoring equipment is used and is appropriate for the nature of the operation and sources.

6. The nominal flow rates and sampling intervals used by the contractor for grab sampling, continuous sampling, personal sampling (i.e., breathing zone), air monitoring, and emergency sampling are based on appropriate technical criteria.

7. Appropriate filter media are used for particulates.

8. The calibration procedures (and frequency) for the air sampling and monitoring equipment are based on appropriate technical criteria.

9. Results of breathing zone sampling are compared with area air sampling.

10. Appropriate radiation detectors are used to analyze air samples.

11. Adequate counting equipment for filters is available. The equipment is properly calibrated and maintained. Counting procedures are available and followed by technicians. Adequate records are maintained to permit QA/QC verification of sample results. Corrections for counting losses due to absorption and/or backscatter within filters are made for alpha and beta radiation.

12. Corrections for radon daughter-product interference are made.

13. Procedures for calibration of air monitors are documented. Included are source check, stability check, electronics check, and air flow calibration.

RP.10 RADIATION MONITORING/CONTAMINATION CONTROL

PERFORMANCE OBJECTIVE

The radiation monitoring and contamination control program should ensure worker protection from radiation exposures.

CRITERIA

RADIATION MONITORING

*1. Survey limits for breathing air are established. These limits are related to the controlled area concentration values in DOE guidance.

2. A documented radiation monitoring program is in place that includes the frequency and location for radiation surveys.

3. Procedures and criteria for completion of survey forms, acceptable radiation levels, evaluation of survey results, and reporting of off-standard survey results are available.

4. Dose rate values are established for posting radiation areas and approximate dose rates are posted.

5. Documented procedures are available and training conducted to ensure that routine dose rate and contamination surveys are conducted in a manner that is consistently repeatable in terms of location, use of smears, and instrument interpretation.

6. Facility area monitoring readouts and alarms are adequate to inform workers of workplace radiation levels.

CONTAMINATION CONTROL

*1. Unrestricted radiological contamination release levels for personnel, equipment and materials, and facility surfaces are defined and comply with appropriate standards.

*2. The system for unrestricted radiological contamination release (i.e., monitoring procedures, authority to release, etc.) ensure that equipment and materials removed from contaminated areas are not contaminated above release levels and are not mixed with clean items prior to a final release.

*3. Radiation work permits or similar controls are used to control access to contaminated areas.

*4. Maximum permissible personnel contamination levels (skin and clothing) have been established. Detected contamination in excess of these levels are investigated and documented as to source, probable cause, and other pertinent information. Records of these investigations are maintained and reviewed by radiological protection management for trends, and corrective action taken as necessary.

5. Adequate documented protective measures are employed, where practicable, to maximize contamination control.

6. Leaks from radioactive systems are promptly contained and repaired, and affected areas are decontaminated.

7. Contamination and dose rate limits for equipment and tools stored and used only in radiation zones are established.

8. Methods, such as coffer dams, drip pans, and containments, are used to minimize the spread of contamination.

9. Contaminated areas are clearly identified and have the contamination levels and the protective measures required clearly posted at the entrance.

10. Protective clothing removal procedures are posted at each contaminated area control point.

11. Contaminated or potentially contaminated areas are adequately surveyed, documented, and posted at specific frequencies, based upon the contamination levels, traffic patterns, and occupancy levels.

12. Routine contamination surveys are conducted in areas that are not normally contaminated. Frequency of those surveys is commensurate with the potential for contamination and with the significance of finding contamination in a particular area.

13. The contamination control program provides maximum accessibility to all areas with minimum use of anti-contamination clothing.

14. Sufficient quantities of protective clothing are available, and are consistently used where required.

15. Laundry procedures minimize spread of contamination.

16. Contamination control levels have been established. Controls are employed for areas, equipment, materials, tools, and other items if contamination levels exceed the established levels. Release surveys are performed by qualified personnel.

17. Operations with a high potential for release of contamination are performed in accordance with job-specific procedures that minimize the potential for release.

18. The use of equipment capable of spreading contamination, such as blowers, fans, and vacuum cleaners, is controlled to prevent the spread of contamination.

19. Procedures for use of step-off pads and the removal of protective clothing are posted where such removal is required and are consistently followed.

20. Personnel exiting posted contamination areas are required to monitor their whole body and extremities for contamination. For personnel

exiting a radiologically controlled area, the degree of monitoring is based on the potential for contamination. Appropriate monitoring equipment is available.

21. Portal monitors are not used as the primary monitoring method for personnel contamination.

22. Facilities for decontamination are available.

23. Adequate counting equipment for swipes is available. The equipment is properly calibrated and maintained. Counting procedures are available and followed by technicians. Adequate records are maintained to permit QA/QC verification of sample results.

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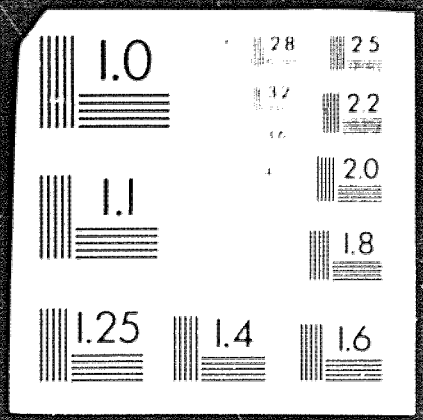

RP.11 ALARA PROGRAM

PERFORMANCE OBJECTIVE

A formally structured, auditable program should be in place with established milestones to ensure that exposures are maintained as low as reasonably achievable (ALARA).

CRITERIA

*1. A documented ALARA program incorporating the guidance contained in DOE/EV/1830-T5 as appropriate is established and audited on a specified frequency.

2. An ALARA Coordinator or other staff has been designated with specific ALARA responsibilities. These responsibilities are documented and integrated into the radiological protection program.

3. The ALARA program and its results reflect management commitment to ALARA. The radiation workers are convinced of management's commitment to ALARA. The radiation workers themselves are committed to ALARA.

4. ALARA goals are established that are measurable and realistic.

5. The methods and procedures to evaluate ALARA data on a specified frequency are established.

6. The ALARA data can be used to identify operations and activities that may need extra attention.

7. ALARA reviews are routinely performed prior to issuing radiation work permits.

8. ALARA is discussed in training given to radiation workers. Specific methods are described for limiting exposure.

9. Meetings are held to discuss complex radiation work with high exposure potential. Dry runs are conducted with "cold" systems.

10. The site has been surveyed to locate any sources of non-productive, low-level radiation exposure and such sources have been eliminated.

11. Trend analysis is performed for both routine and repetitive operations. Management reviews these analyses on a specified frequency and takes appropriate action.

PF. PERSONNEL PROTECTION

1. ORGANIZATION AND ADMINISTRATION
2. PROCEDURES AND DOCUMENTATION
3. MANAGEMENT OF HEALTH AND SAFETY CONCERNS
4. SURVEILLANCE OF HEALTH AND SAFETY CONCERNS
5. COMPLIANCE WITH OCCUPATIONAL HEALTH STANDARDS
6. COMPLIANCE WITH OCCUPATIONAL SAFETY STANDARDS
7. PERSONNEL COMMUNICATION PROGRAM

PP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

Site and facility organization and administration should ensure effective implementation of the personnel protection program.

CRITERIA

*1. Line management assures the implementation of the personnel protection programs that effectively maintain workplaces free of health and safety concerns.

2. The personnel protection technical support staff is organized to assure that the staff has a direct line of communication with top management. Reports and recommendations of the technical staff are not subject to inappropriate non-technical management review and approval.

3. The staff responsible for the direction and operation of personnel protection programs are professionally qualified and have sufficient time and authority to implement the established program.

4. The professional/technical staffs participate in continuing and advancing education programs to maintain professional vitality.

5. Necessary information is readily communicated to top management, to all segments of the organization concerned, and to the public and regulatory agencies, as appropriate.

6. Resources are allocated and established to meet the operational requirements of the personnel protection programs.

7. Occupational safety and health issues are factors in establishing priorities for spending on capital improvements projects.

8. Management establishes specific goals and objectives for reducing the frequency and severity of occupational accidents, injuries, and illnesses.

9. Effective quality assurance programs are incorporated into the personnel protection programs to monitor the workplace.

10. A formal program internal audit is used to evaluate the effectiveness of the personnel protection program activities.

PP.2 PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE

Procedures and documentation should provide appropriate direction, record generation, and support for the personnel protection program.

CRITERIA

*1. Operating procedures provide direction to ensure that potential hazards are identified for correction, and that health and safety requirements are uniformly implemented.

*2. Written occupational safety and industrial hygiene policies are readily available to all organization elements, periodically reviewed, and kept current.

3. Personnel protection policy statements are consistent with the requirements of applicable DOE Orders.

4. Policies and management directives clearly define authority and responsibility at each level of the organization for the control of occupational hazards.

5. Work permits identify potentially hazardous maintenance, construction, experiments, and other non-routine activities and assure the appropriate application of safety and health expertise to planning and review of the work.

6. Specific quality criteria are established for data collection and use associated with personnel protection programs. Examples include: sampling protocols, chain of custody records, laboratory accreditation, minimum detection limits, and report distributions.

7. Current copies of DOE Orders, prescribed standards, and applicable codes and regulations are readily available.

8. Systems for health and safety performance reporting and analysis are actively used.

9. A formal program is established to track the correction of identified deficiencies and deviations from prescribed standards.

PP.3 MANAGEMENT OF HEALTH AND SAFETY CONCERNS

PERFORMANCE OBJECTIVE

Chemical, physical, and/or other environmental stresses arising in the workplace should be identified, evaluated, and controlled.

CRITERIA

*1. There is a documented program for identifying existing and potential occupational safety and health concerns through:

- A knowledge and assessment of operations;
- Periodic walk-through surveys by technical and management personnel;
- Reviews of proposed activities and modifications to existing operations, including reviews of new or modified processes and chemicals;
- Review of purchase orders; and
- The maintenance of inventories and/or tracking systems.

*2. There is a systematic program for evaluating health and safety concerns once they have been identified, which includes:

- Potential health and safety concerns are evaluated to assure they are adequately controlled and that standards are met;
- Guidelines are developed for potential health and safety concerns if no standard or assigned permissible exposure limit exists;
- Air sampling, bioassay, noise survey, etc., are conducted at the facility as called for by the facility policy statements; and
- Written evaluations giving the conclusions on the adequacy of controls and workplace monitoring data are sent to first level supervisors.

*3. Process, operating, mechanical, and/or administrative controls are effective in assuring that the health and safety of employees are adequately controlled:

- Formal recommendations of control measures are made to the first level supervisor, and

- The hierarchy of recommendations for control of health and safety concerns favors engineering control; process change or material substitution, where possible; then administrative controls; and finally, personnel protective equipment.

4. Periodic inspection and maintenance programs are established for all mechanical/engineered contaminant control systems.

5. Operator and supervisory training programs include instruction in the proper use, maintenance, and performance of control systems and procedures.

6. Monitoring data are regularly obtained for potential health and safety concerns and the information is utilized in determining the effectiveness of control measures.

7. Specialized equipment and technical resources are maintained and operated in a reliable and proper manner.

8. Adequate facilities, such as laboratories, record and sample storage, offices, and training areas, are available for effective program implementation.

9. Proper personnel protective equipment is available, its use is enforced, and proper training for its use is provided.

10. Housekeeping practices and programs reflect a commitment to minimize contamination of areas, equipment, and/or personnel.

PP.4 SURVEILLANCE OF HEALTH AND SAFETY CONCERNS

PERFORMANCE OBJECTIVE

Appropriate surveillance of activities should be conducted to measure safety and health performance and ensure the continued effectiveness of controls.

CRITERIA

*1. There is a formal system for reporting injuries, illnesses, accidents, and unusual occurrences.

*2. Accident investigations are conducted for incidents and events that resulted or could have resulted in occupational injuries, illness, or death to identify probable causes and judgement of needs to prevent recurrence of similar accidents.

*3. There is a health and safety surveillance program for construction activities.

*4. There is a documented program for periodic monitoring of chemical, physical, and biological stresses to ensure maintenance of satisfactory conditions. Surveillance monitoring ensures that potential personnel exposures are accurately determined and recorded. Monitoring results which evaluate the continuing adequacy of controls are sent to line management and employees on a routine basis.

5. A personnel exposure surveillance data base exists which permits estimates of credible exposures to chemical, physical, and/or biological stresses of significance in the workplace. The data base includes such things as data from personal, coworker, area, and operational sources.

6. Occupational safety performance is compared with the results of individual programs with related general experience of similar DOE operations.

7. Analyses of accident, injury, and industrial hygiene monitoring data are performed to evaluate performance and identify trends and potential problem areas to be brought to management attention.

8. There is a system for employees to report potential occupational safety concerns that assures prompt assessment and necessary controls.

PP.5 COMPLIANCE WITH OCCUPATIONAL HEALTH STANDARDS

PERFORMANCE OBJECTIVE

Facility operations should comply with DOE-prescribed standards for the evaluation and control of occupational health standards.

CRITERIA

*1. Asbestos removal operations associated with remodeling and maintenance work are handled in accordance with 29 CFR 1926.58 and other asbestos handling operations comply with 29 CFR 1910.1001.

*2. Hazardous noise is controlled in accordance with ACGIH TLVs and the hearing conservation program complies with 29 CFR 1910.95.

*3. Exposure to chemical listed as carcinogens by the ACGIH or OSHA are maintained ALARA by applying controls required by standards in 29 CFR 1910 Subpart Z or criteria in DOE 5480.10.

*4. The evaluation and control of occupational exposure to laser light conforms to the requirements of ANSI Z136.1-1986.

*5. Procedures used for working in confined spaces comply with ANSI Z117.1-1977.

*6. Hazardous waste handling operations and hazardous material emergency response operations comply with 29 CFR 1910.120.

*7. The evaluation and control of occupational exposure to electromagnetic fields complies with the requirements of ANSI C95.1-1982.

*8. Chemical handling operations comply with applicable OSHA standards 29CFR 1910.1003 through 1910.1048.

*9. A documented respiratory protection program, complying with ANSI Z88.2-1980, has been implemented to ensure optimum protection against internal exposure of workers to toxic materials, including radioactive substances.

10. A record is maintained of the people working in regulated areas.

PP.6 COMPLIANCE WITH OCCUPATIONAL SAFETY STANDARDS

PERFORMANCE OBJECTIVE

Work places should be free of uncontrolled physical hazards and be in compliance with DOE-prescribed occupational safety standards.

CRITERIA

*1. There are appropriate danger, warning, and safety information signs throughout the facility in accordance with 29 CFR 1910, Subpart J.

*2. The facility is clean, uncluttered, and free of safety concerns for tripping and falling on all walking and working surfaces as required by 29 CFR 1910, Subpart D.

*3. Ladders, guard rails, and fall protection equipments are well-maintained and meet standards prescribed in 29 CFR 1910, Subpart D.

*4. Guarding is available and in place, as specified in 29 CFR 1910, Subpart O, for machines with moving and rotating parts that may present workplace safety concerns.

*5. Exits are properly marked and adequately lighted in accordance with 29 CFR 1910, Subpart E.

*6. There is an inspection and preventative maintenance program for powered platforms, hoisting and rigging devices, cranes and other powered tools and machinery. Operational procedures are in compliance with the DOE Hoisting and Rigging Manual and 29 CFR 1910, Subparts F and N.

*7. Compressed gas containers and other high pressure systems are inspected, stored, and maintained to minimize occupational safety concerns in accordance with 29 CFR 1910, Subpart M.

*8. Electrical safety procedures and rules are in place in accordance with 29 CFR 1910, Subpart S.

*9. Programs exist as appropriate for the handling, processing, storing, transporting, and shipping of explosives materials in accordance with the DOE Explosives Safety Manual and 29 CFR 1910, Subpart H.

10. Personnel are aware of and follow procedures for lockout and tagout to prevent accidental contact with energized electrical circuits and other hazardous energy sources.

11. There are safety rules and requirements for the use of motorized equipment and motor vehicles. Personnel understand and comply with the rules.

PP.7 PERSONNEL COMMUNICATION PROGRAM

PERFORMANCE OBJECTIVE

Facility personnel should be adequately informed of chemical, physical, and biological stresses that may be encountered in their work environment.

CRITERIA

*1. Hazardous chemicals are appropriately labeled.

*2. Material safety data sheets for hazardous chemicals are readily available. Distribution is appropriate for those who need the information.

*3. Employees and supervisors are informed of the rights and responsibilities and the company and DOE resources available to resolve concerns on potential hazards in their work environment.

*4. DOE 5483.1A required information on employee occupational safety rights and obligations are visibly posted at the facility.

*5. Employees are provided written notification of monitoring results when an employee's exposure exceeds permissible limits.

6. Occupational safety and health awareness among employees and other facility and site personnel is actively promoted. There is a documented program for communicating to all persons in the facility a knowledge of the hazards present.

7. There is an occupational safety and health training program that includes activities that motivate, educate, and train employees to recognize, correct, or report hazards in the workplace.

8. Occupational safety and health training programs for all facility employees include indoctrination on safe work practices and procedures.

9. Procedural reminders are posted locally (i.e., "Fire Door-Keep Closed At All Times").

10. Employees are provided an opportunity to participate in the safety and health program through regular meetings, suggestion programs, participation in inspections, or other means.

FP. FIRE PROTECTION

1. ORGANIZATION AND ADMINISTRATION
2. LIFE PROTECTION
3. PUBLIC PROTECTION
4. IMPAIRMENT OF OPERATIONS
5. PROPERTY PROTECTION
6. FIRE DEPARTMENT OPERATIONS
7. PROGRAM IMPLEMENTATION

NOTE:

The facility will be expected to have a fire drill while the TSA team is at the facility. The drill should be planned in conjunction with the TSA team member. This drill could be planned in conjunction with the Emergency Drill required (see Emergency Preparedness)

FP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE

Fire Protection organization and administration should ensure the effective implementation and control of fire protection equipment and activities.

CRITERIA

*1. The fire protection organizational structure is well defined and understood.

*2. Resources are allocated and established to accomplish assigned tasks.

*3. Responsibilities and authority of each management, supervisory, and professional position are well defined.

*4. Personnel clearly understand their authority, responsibilities, accountabilities, and interfaces with supporting groups.

*5. Policy is established for overall direction of the fire protection program.

*6. Fire protection standards are established and incorporated in the plans and specifications for all new buildings and major modifications of existing buildings.

*7. Survey, audits, and appraisals are performed to assure proper implementation of fire protection standards.

FP.2 LIFE PROTECTION

PERFORMANCE OBJECTIVE

The facility should provide adequate life safety provisions against the effects of fire.

CRITERIA

*1. There is a program in place to ensure that facilities include NFPA 101, "Life Safety Code", requirements and conformance is verified by periodic field inspections.

2. Where strict code compliance is not feasible, as in some containment structures, alternative protection is provided in the form of personnel limitations, added control of combustibles, superior protection and/or construction, and strong management control (added inspection/maintenance etc.).

3. Security considerations do not jeopardize life safety provisions.

FP.3 PUBLIC PROTECTION

PERFORMANCE OBJECTIVE

The facility should provide adequate protection to prevent any added threat to the public as the result of an onsite fire causing the release of hazardous materials beyond the site (or facility) boundary.

CRITERIA

*1. Facility operating procedures acknowledge the risk of fire. Appropriate provisions are in place to assure safe operation and shutdown, and that fire protection features are not compromised.

*2. A Safety Analysis Report, Fire Hazard Analysis, or similar document has been prepared which evaluates the potential for release of hazardous materials beyond the site or facility boundary as a result of a fire. These are considered in the emergency preparedness program.

3. Operations or facility contents posing a threat to the environment, and combustible materials, are limited to the extent that an offsite release (may be defined as facility release) is not credible from a postulated fire. Construction features, including containment, confinement, ventilation protection systems, and automatic fire protection features, are sufficient to preclude an offsite release in the event of a postulated fire.

FP.4 IMPAIRMENT OF OPERATIONS

PERFORMANCE OBJECTIVE

The facility should not be vulnerable to being shut down for an unacceptable period as the result of a credible fire.

CRITERIA

*1. A credible fire will not result in the shutdown of the facility for a period longer than that defined by the program authority, or, in the absence of a defined period, not longer than 3 months for a vital (one-of-a-kind) facility, or 6 months for an important facility.

*2. Loss of facility manufacturing capabilities, or losses of storage for products or materials onsite, will not affect another DOE facility for periods longer than defined in #1 above.

FP.4 PROPERTY PROTECTION

PERFORMANCE OBJECTIVE

A maximum credible fire, as defined in DOE 5480.7, Section 6.f, should not result in an unacceptable property loss.

CRITERIA

*1. The maximum property loss, due to the maximum credible fire scenarios, as defined in DOE 5480.7, Section 6.f, will not exceed $1 million, assuming the functioning of installed, automatic, fire protection systems.

*2. The maximum credible property loss will not exceed $50 million, assuming the failure of a single protection system. A redundant fire protection system is provided if the maximum credible loss may exceed $50 million.

*3. The maximum property loss from a fire will not exceed $75 million, assuming failure of primary and redundant protection systems.

*4. Water supplies and the water supply system; e.g., source, storage facilities, pumps, underground piping, isolation valves, etc., are reliable and sufficient for the maximum credible fire.

5. Fire hydrants and fire department connections are accessible, protected, and appropriately located.

FP.6 FIRE DEPARTMENT OPERATIONS

PERFORMANCE OBJECTIVE

The Fire Department should have the capacity to promptly terminate and mitigate the effects of a fire in a safe and effective manner.

CRITERIA

*1. The Fire Department operations comply with National Fire Protection Association Codes and Standards.

*2. There is a plan in place to achieve compliance with NFPA Standard 1500.

*3. There is a training program in place for certifying Fire Department personnel to NFPA and/or State requirements. There is a documented program for verifying the proficiency of Fire Department personnel. Training records are maintained.

4. Adequate resources are allocated and established to ensure that Fire Department staffing, fire suppression equipment, and support facilities are appropriate and adequate to respond safely to any credible site/facility fire emergency.

5. There are pre-fire plans which reflect the current conditions at the site and facilities. The fire department/fire brigade are drilled in their use.

6. There is a documented program established which requires Fire Department fire fighters and officers to tour each site facility a minimum of once each quarter.

7. Mutual-aid agreements are in place with nearby agencies, or there is a documented procedure in place, for the call-back of off-duty fire suppression personnel.

FP.7 PROGRAM IMPLEMENTATION

PERFORMANCE OBJECTIVE

A fire protection engineering program should be in place to effectively provide and maintain an "improved risk" level of fire protection.

CRITERIA

*1. Fire protection engineering review and approval is required in the planning and design of all new projects, building modifications, and renovations, including the acceptance of fire protection systems.

*2. Fire protection systems and equipment; e. g., suppression systems, detection systems, fire pumps, portable extinguishers, etc., are inspected, tested, and maintained in accordance with the National Fire Protection Association Codes and Standards.

*3. Fire Protection Engineering Surveys are conducted as defined in DOE 5480.7.

4. Documented programs are in place for the control of welding/cutting operations, use of flammable materials, and hazardous materials.

5. A documented fire barrier maintenance program is in place.

6. A formal system has been established to track and document completion of fire protection findings, recommendations, and other items that result from Fire Protection Engineering Surveys, fire protection system inspections, and other audits and appraisals.

7. An annual documented review is made of the fire protection program.

APPENDIX B

DOE Orders Applicable to Operational TSAs

DOE ORDERS APPLICABLE TO OPERATIONAL TSAs

1324.2 RECORDS DISPOSITION 5-28-80

Assigns responsibilities and authorities and prescribes policies, procedures, standards, and guidelines for the orderly disposition of records of DOE and its operating and on-site service contractors.

4330.4 REAL PROPERTY MAINTENANCE MANAGEMENT 3-25-82

Provides policy and procedures for establishment of programs for the maintenance and repair of DOE real property.

5000.3 UNUSUAL OCCURRENCE REPORTING SYSTEM 11-7-84, 1-25-85

Sets policy, assigns responsibility, and provides criteria and instructions for reporting unusual occurrences that have programmatic significance at DOE operations, analyzing the information reported, and disseminating the analysis results.

5480.1B ENVIRONMENT, SAFETY AND HEALTH PROGRAM FOR DEPARTMENT OF ENERGY OPERATIONS 9-23-86

Establishes ES&H program for DOE operation, including:

a) ES&H policy

b) TSA programs

c) Assistant Secretary's shutdown authority.

5480.3 SAFETY REQUIREMENTS FOR THE PACKAGING AND TRANSPORTATION OF HAZARDOUS MATERIALS, HAZARDOUS SUBSTANCES, AND HAZARDOUS WASTES 7-9-85

Establishes requirements for packaging and transportation of hazardous materials, hazardous substances, and hazardous wastes.

5480.4 ENVIRONMENTAL PROTECTION, SAFETY AND HEALTH PROTECTION STANDARDS 5-15-84

Specifies requirements for the application of the mandatory ES&H standards applicable to all DOE and contractor operations; provides a listing of reference ES&Ó standards; and identifies the sources of the mandatory and reference ES&H standards.

5480.5 SAFETY OF NUCLEAR FACILITIES 9-23-86

Establishes nuclear facility safety program requirements to assure:

a) facilities meet standards applied to comparable licensed facilities

b) materials are handled such that the probability of an accident is acceptably low

c) an ES&H program is established

d) ES&H matters are comprehensively addressed

e) criticality hazards are properly addressed

f) property and operators are protected from the effects of potential accidents.

5480.6 SAFETY OF DEPARTMENT OF ENERGY-OWNED NUCLEAR REACTORS 9-23-86

Establishes reactor safety program requirements to assure:

a) safety of each DOE reactor is properly evaluated

b) adequate protection is provided for health and safety and consistent with uniform standards, guides and codes applied to comparable licensed reactors.

5480.7 FIRE PROTECTION 11-16-87

Establishes requirements for an improved risk level of fire protection, which is characterized by a sufficiently high level of fire protection to fulfill industrial fire insurance company insurability requirements.

5480.9 CONSTRUCTION SAFETY AND HEALTH PROGRAM 12-18-80

Establishes procedures and guidance for protection of DOE and contractor employees engaged in construction activities; protects the general public, protects adjacent property, and prevents delays or interruption of DOE programs.

5480.10 CONTRACTOR INDUSTRIAL HYGIENE PROGRAM 6-26-85

Establishes requirements and guidelines applicable to DOE contractor operations for maintaining an effective industrial hygiene program to preserve employee health and well-being.

5480.11 RADIATION PROTECTION FOR OCCUPATIONAL WORKERS 12-21-88

Establishes radiaiton protecion standards and program requirements for DOE and contractor operations.

5480.15 DEPARTMENT OF ENERGY LABORATORY ACCREDITATION PROGRAM FOR PERSONNEL DOSIMETRY 12-14-87

Establishes requirements for evaluating DOE and contractor dosimetry programs.

5481.1B SAFETY ANALYSIS AND REVIEW SYSTEM 9-23-86

Establishes requirements for the preparation and review of safety analyses of DOE operations, including identification of hazards, their elimination or control, assessment of the risk, and documented management authorization of the operation.

5482.1B ENVIRONMENT, SAFETY AND HEALTH APPRAISAL PROGRAM 9-23-86

Establishes the ES&H appraisal program for DOE, including:

a) program policy

b) identification of specific types of appraisals

c) defining criteria as tests against which the quality of performance can be measured.

5483.1A OCCUPATIONAL SAFETY AND HEALTH PROGRAM FOR DOE CONTRACTOR EMPLOYEES AT GOVERNMENT-OWNED CONTRACTOR-OPERATED FACILITIES 6-22-83

Establishes requirements and procedures to provide occupational safety and health protection for DOE contractor employees consistent with the OSHA standards.

5484.1 ENVIRONMENTAL PROTECTION, SAFETY AND HEALTH PROTECTION INFORMATION REPORTING REQUIREMENTS 2-24-81

Establishes requirements and procedures for reporting of information having environmental protection, safety or health protection significance for DOE operations.

5500.1A EMERGENCY MANAGEMENT SYSTEM 2-26-87

Establishes overall policy and requirements for an Emergency Management System to provide development, coordination anc direction of DOE planning, preparedness and readiness assurance.

NOTICE 5500.2 EMERGENCY PREPAREDNESS PROGRAM AND NOTIFICATION SYSTEMS 2-26-87

Establishes DOE Emergency Preparedness policy.

5500.3 REACTOR AND NON-REACTOR NUCLEAR FACILITY EMERGENCY PLANNING, PREPAREDNESS AND RESPONSE PROGRAM FOR DEPARTMENT OF ENERGY OPERATIONS 8-13-81

Establishes requirements for development of DOE site specific emergency plans and procedures for radiological emergencies at DOE reactors and non-reactor nuclear facilities.

5700.6B QUALITY ASSURANCE 9-23-86

Provides DOE policy, sets requirements and assigns responsibilities for establishing, implementing and maintaining plans and actions to assure quality achievement in DOE programs.

5820.2 RADIOACTIVE WASTE MANAGEMENT 2-6-84

Establishes policies and guidelines by which DOE manages its radioactive waste, waste byproducts and radioactively contaminated surplus facilities.

6430.1 GENERAL DESIGN CRITERIA 12-12-83

Chapter IV, Architectural and Structural
Chapter XXIII, Unirradiated Enriched Uranium Storage Facilities

Provides general design criteria for use in the acquisition of DOE's facilities.

END

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9/12/90

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